JULY, 1952

Traffic Engineering

Chicago — Host City 23rd Annual Meeting ITE

- Traffic Engineering in Seattle—Part I
- Traffic Relief Through Modernized Management
- Considerations Affecting Surface Mass Transit Routing
- Traffic, Parking and Petroleum Marketing
- Characteristics of Left-Turning Passenger Vehicles

Official Publication of the Institute of Traffic Engineers

23rd Annual Meeting
SEPTEMBER 8-11, 1952
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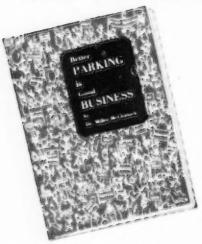

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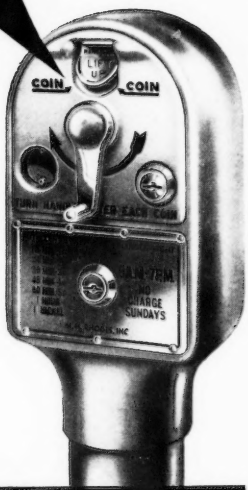

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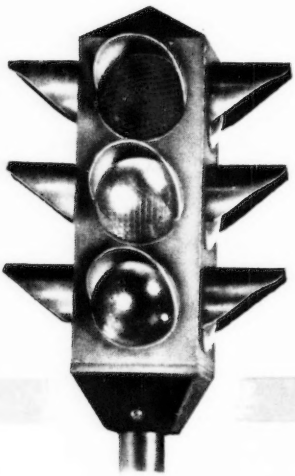

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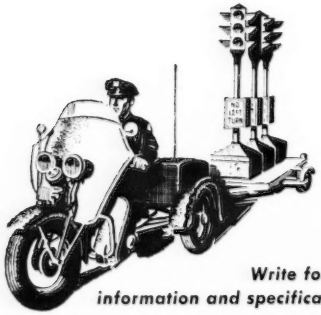

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Traffic Engineering

OFFICIAL PUBLICATION OF THE INSTITUTE OF TRAFFIC ENGINEERS

VOLUME XXII | JULY, 1952 | NUMBER 10

COVER: Aerial view from the lake front looking south into Chicago, scene of the 23rd Annual Meeting of the Institute of Traffic Engineers September 8-11. In foreground is the magnificent limited access Lake Shore Drive and part of the lake-front park system. Fashionable Northside neighborhood at extreme right; famed "Gold Coast" extreme left; "Loop" district including Hotel Sherman location, tall buildings in distance left center.

Photo: Chicago Park District

Traffic Engineering is that phase of engineering which deals with the planning and geometric design of streets, highways, and abutting lands, and with traffic operation thereon, as their use is related to the safe, convenient, and economic transportation of persons and goods.

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Frankly Speaking

MEMBERS of the Institute of Traffic Engineers have a special interest in this year's Annual Convention in Chicago, when the Institute, along with nearly all other engineering societies, participates in celebrating the centennial of the American Society of Civil Engineers.

One hundred years ago all engineering outside of military was classed as civil engineering. As industrial development and urban life expanded, the specialists within the profession increased in numbers and duties until they developed their own specialized societies. The Institute, one of the more recently organized societies, is itself nearly a quarter-century old, which sets it well on the way through its own first century.

From a charter membership of 30 in 1931, the Institute of Traffic Engineers has grown to 650 members with a full-time executive secretary and staff, and a headquarters stocked with abundant scientific information. The founders were young men and today a great majority of members also are young men. It is a young man's society and profession with a future increasingly bright.

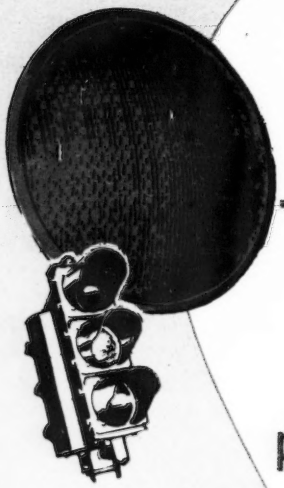
For, in years to come, however many individuals may take to the air in rockets, all must come down finally to earth. Man is destined by force of gravity to crawl on the earth in motor vehicles. Therefore, through the foreseeable future, engineers will be confronted with a traffic problem posed by increasing population and expanding highway transport.

Although 20 years ago the traffic engineer struggled to make himself understood and was tossed back and forth between police department and department of public works, today his services are in demand and, in the most progressive cities, he ranks as a department head on a par with the city engineer and police commissioner. The intimate association and influence of traffic engineers with everyday life has thrust this comparatively young branch of civil engineering into public demand and worth beyond the expectation of its years.

The Chicago centennial in September offers the opportunity to demonstrate publicly that traffic engineering has become of age and takes its place with other branches of engineering to serve the community.

J. L. Wehmeyer

Director



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When traffic comes and
traffic goes,

And keeps on whizzing
past your nose,

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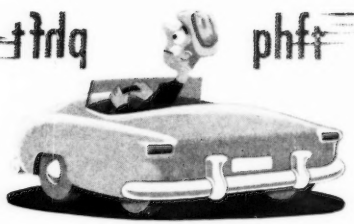

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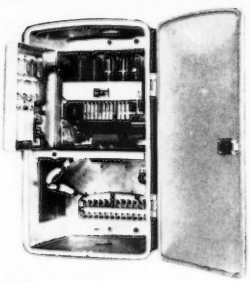

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Traffic Engineering in Seattle - Part 1

By J. W. Arch Bollong (Mem., ITE)
Traffic Engineer, City of Seattle, Washington

This is the fourteenth of a series of articles written by traffic engineers of cities of various sizes throughout the country.

Mr. Bollong prepared this article, which includes activity summaries by five of his Assistants, in connection with his final report to the City Administration preliminary to his retirement from city service July 1, 1952, to devote full time to his consulting firm. Space does not permit running full article in this issue; the final part will appear in August.

PROLOGUE

THE City of Seattle is located on an inland sea known as Puget Sound. It has many cognomens, all of which it thoroughly stands behind. It has been known as the Gateway City to the Orient. It has been known as the Center of the Evergreen Playground, the location of the Gold Cup competitions, a Yachting and Sportsman's Paradise, also as an International Settlement, the latter especially because of the Asiatic element although Norway, Sweden, and other countries are well represented.

Standing on a series of hills, Seattle has a view of the wonderful snow-capped Olympic Mountains to the west, the Cascade Mountains to the east, with Mt. Rainier, elevation 14,500 feet, standing like a sentinel to the southeast. Elliott Bay, on which Seattle borders, is large enough to anchor the entire fleet of the United States Navy. Seattle is bordered on the east by a fresh-water lake thirty miles in length, upon which rowing contests have been held with crews from all over the United States. We might mention that the University of Washington has obtained more "firsts" in these rowing sessions than any other college in the country. The existence of fresh water to the east and salt water to the west (connected by a ship canal for ocean-going vessels) creates an hourglass condition in the Central Business District that is spoken of throughout this article. Our industrial district to the south, formerly salt water, is now filled in as tideland. Our Central Business District was originally confined by hills, but with the Seattle spirit a group of these hills was sluiced into the sea, some 500,000 yards of dirt being sluiced under one contract.

A Traffic Engineer for the City of Seattle was initiated in the year 1924. The population in this area, especially since the Second World War, has grown in leaps and bounds. In fact, the western states of California, Oregon, and Washington have experienced a faster growth in population and vehicular registration than any other part of the United States. This is a challenge, and we believe we have met it. We believe we have one of the finest Traffic Engineering organizations anywhere in this Union.

We are one of the few Traffic Engineering Divisions to combine all the functions of Traffic Engineering in one office —the designs, the surveys, the findings, the recommendations, are all put into force by the Traffic Engineering construction crews.

J. W. Arch Bollong

Between the long-haired groups of engineers in the office and the short-haired groups in the field we have a team that carries the ball every time the quarterback gives the signal.

Seattle's street pattern, it may be said, like Topsy "just grew." The original streets, platted in 1870, were laid parallel to the water and ran southwesterly and northeasterly. After other pioneers came in the platting pattern became north and south and east and west. We were fortunate in having sufficient property so that we have street widths in the Central Business District of 66 feet to 80 feet from property line to property line, and a waterfront highway of 180 feet known as Alaskan Way.

Signal installation has progressed from the original sign flasher type of control in 1925 to the intricate type described by our signal engineer in the ensuing article. We have invented or designed our own line-painting machines, our own paint mixture, our pedestrian luminaires, jack-mounted relays and controls and so on, and have had charge of the laying out of the 333 miles of modern traffic safety mercury vapor lighting being installed in this city.

All of our Traffic Engineering personnel are graduates of the University of Washington except one. Two have taken the graduate course of the Yale University Bureau of Highway Traffic and one has completed the course in Traffic and Transportation at the University of California in Berkeley. We have only one member who is from the East, that is, from Philadelphia and Toledo.

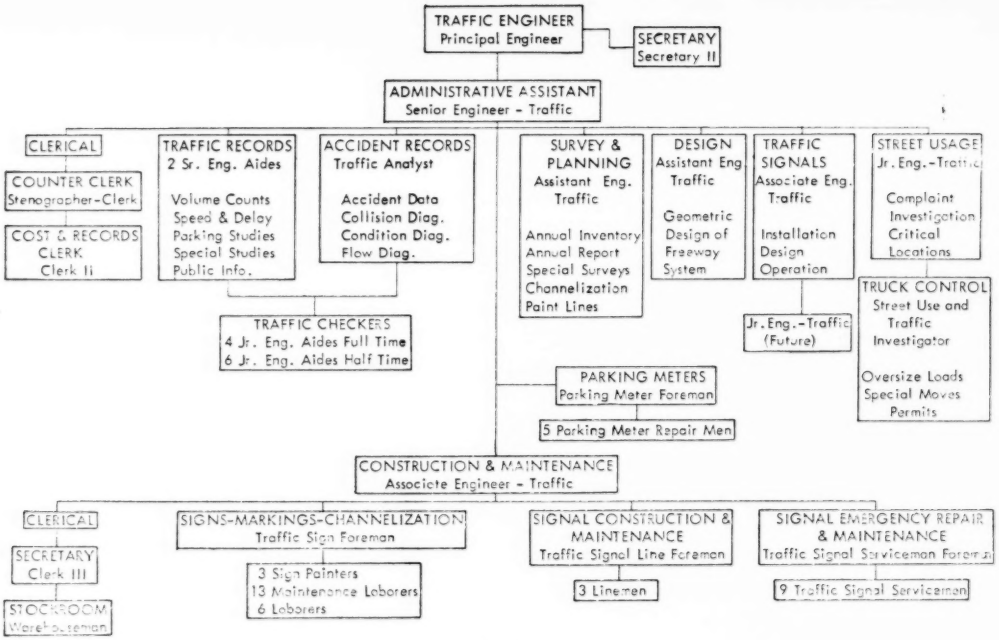

Fig. 1
Organizational Chart-Traffic Engineer Division

Traffic Engineering was first initiated in this city due to the fact that we purchased from Stone & Webster a street car system costing fifteen million dollars and it was necessary to construct and install safety zones and signs of some character. Inasmuch as there was no standard in existence at the time it was necessary to set up our own standard. Inasmuch as there was no traffic code, it was necessary to write such a code. This was done in 1919, long before standardization took place. The Traffic Engineer of this city welcomed with open arms the conferences held in Washington, D. C., known as the National Conference of Street and Highway Safety, and the formation of the Institute of Traffic Engineers in 1931. With faith and confidence that Traffic Engineering was to have a place in the sun, which it surely now has attained, we have continued to progress.

The Traffic Engineering Division of Seattle is one of the few who have annually produced an Annual Report. This we submit for your perusal. Traffic counts have been taken at stragetic locations in the City of Seattle every year since 1917. These counts were quite vital when predicting future traffic volumes, although we must confess that the war and the unthought of population increase and resultant vehicular registration somewhat upset our predictions. Instead of a 2½ per cent increase in registrations yearly predicted, since the Second World War we have experienced a 6 to 7 per cent increase yearly. We have had, also, unusual growth of population in the environs of the city as the city proper has become somewhat saturated, so that, as you will note, we have 209,000 cars inside the city and at the same time we have 275,000 in King County of which Seattle is a part, all of which enter this city. With the shipyards and Boeing Airplane Co. and other industries having some 98,000 personnel, this involves a traffic problem, especially in the peak hours. The challenge of this problem has been met, as you will note, by the facilities that have been installed in this city during the past years. The Traffic Engineering organization described and illustrated in the attached article is not merely an ideal, it is an actuality. We believe in realities and have so modeled our progress.

When Seattle progressed from street cars to rubber, that is, trolley coaches, diesels, and gas coaches, it was with great relief that we pulled up all of the street car rails and moulded them into propeller shafts for destroyers being built in this city. The initiation of prohibited parking in the peak hours of 7 to 9 in the morning and 4 to 6 in the evening was a fortunate stroke during World War II years in order that the personnel discharged at 5 and 4 o'clock be enabled to arrive at their places of residence without undue congestion. We had the greatest increase in our history in those years. The Traffic Engineering Division had a great part in moulding the war transportation system in this city. Movable graphs were made up and the work force dispersed so that the valleys were filled and the peaks cut off. During World War II mass transportation carried 65 per cent of those moving, while private transportation carried 35 per cent. At the present time the picture is just reversed. Mass transportation carries 35 per cent and private cars carry 65 per cent. And the end is not yet.

Some have said that the solution of the traffic problem is the elimination of private transportation and the installation of modern transportation. We *hate* that modern transportation, quiet, fast, and convenient. But it does not elimi-

nate the desire of the American public to travel when, where, and how they want.

The reader will note from this article that we are religiously following all the standards that have been laid down by the Bureau of Public Roads, the American Association of State Highway Officials, and other acknowledged authorities. We hence present to you a resume by those in charge of our various departments. We might entitle this article "Hourglass Traffic Engineering."

Fig. 2
Origin and Destination Survey Interview Station

TRAFFIC SURVEYS

By E. E. Lewarch (Assoc. Mem., ITE)
Senior Engineer — Traffic

The decade from 1940 to 1950 brought to Seattle a 63 per cent increase in vehicles and a 25 per cent increase in population. It brought similar increases to adjacent communities, resulting in a tributary population of nearly 1,000,000 persons, of which this city of 500,000 is the hub.

The proper solutions to the complex problems created by the demands of this tremendous increase in vehicular and pedestrian volumes on our street system require an exact knowledge of the basic data related to vehicular and pedestrian movement.

To acquire these data we have applied the following routine study procedures for field and office tabulation:

Accident Studies

Washington State requires all drivers involved in accidents to prove their financial responsibility. As a result, most drivers carry insurance and most accidents are reported. Proof of this is indicated by the 18,000 accidents reported to the Police Department in 1951. A copy of each accident report is forwarded by the Police Department to the Traffic Engineering Division where engineering data is transferred from the reports to cards filed by location, thereby creating a running inventory of accident occurrence at each location in the city. By maintaining a running inventory of this character the accident analyst is enabled to note hazardous locations as they develop and schedule them for further field study.

The data tabulated on these cards provide an invaluable record for conducting before-and-after studies as well as for preparing special studies to determine the need for physical improvements and corrections, for example, traffic safety lighting installations to reduce night accident hazards.

Volume Counts

Vehicular and pedestrian volumes are counted manually at all locations which indicate the need for Traffic Engineering study. In addition, automatic counters are installed on outlying sections of the major street system to provide data for trend studies and the preparation of flow maps.

Manual tabulations generally cover the 16-hour period between 6 A.M. and 10 P.M., although peak-hour counts are often scheduled to obtain data for problems related to the peak periods only. During a typical year approximately one hundred and fifty 16-hour counts, 75 short counts, and 100 automatic counts are obtained by Traffic Engineering Division personnel.

Volume counts are essential to determine the need for

and type of corrective treatment for any location being studied. In this respect an Intersection Correction Sheet has been developed on which are plotted vehicular volume, accident record, physical conditions, and approach speed for a given location. This combination of basic information onto one drawing enables the analyst to assimilate the various factors involved more readily and thus expedites his recommendations for corrective treatment.

Spot Speed Checks

In order to evaluate properly problems of congestion and accident hazard, it is necessary to measure the speeds of vehicles traversing the street system in the areas where these problems occur.

Measurements of speed are made by the use of Enoscopes, or mirror boxes, set 176 feet apart. Tabulations are made of the time required for vehicles to traverse this distance and the speed of the vehicles is calculated from the time and distance measurements.

Speed studies are used to assist in the design of corrective installations and to determine the proper speed limit for use in speed zoning. In one study the speeds of 20,000 vehicles at ninety-two locations were measured to determine the proper speed limit for the arterial street system. As a result, the 80 percentile speed of 30 M.P.H., determined by the study, has been established as the legal speed limit on arterial highways.

Speed and Delay

Over-all efficiency of operation of our major routes is measured by operating a vehicle in the traffic stream so that its over-all speed is representative of the average speed of vehicles traversing the area. Recorders traveling in the vehicle tabulate the length of time required to travel through the section being studied as well as noting the location and duration of delay along the route.

Studies of this nature are used to determine the need for and nature of revisions in signal operation, such as progression speeds, and to establish the location and duration of parking prohibition.

Street Use

The Traffic Engineer is responsible for the routing of all over-size and over-weight loads and supervises the movement of these loads in the field. In addition, the operation of all trucks inside the city is subject to check by Traffic Engineering Division personnel to insure comformance with laws regarding size, length, height, and weight of load.

Curb space used for special purposes such as truck loading, passenger loading, etc., is allocated by the Traffic Engineer on the basis of need, after field checks. Special studies are conducted to determine the warrant for parking meter installations and the need for extension, reduction or installation of restrictions limiting the duration of parking.

Studies of mass transportation operation are conducted to determine the proper size and location of bus loading zones, speed through signal systems and proper routing of interurban bus lines.

Origin and Destination

Origin and Destination studies are conducted in cooperation with state and federal agencies on a city-wide scale or independently where required to aid in the solution of special local problems.

Local studies included the interviewing of parkers in a lot serving a tourist attraction to determine the address of origin of parkers in the lot and thus the number of tourists using the lot.

City-wide studies included the interviewing of persons in their homes to establish travel habits of drivers and thus provide data for locating new traffic facilities. This study provided information for locating a freeway system, the first section of which will be open to traffic this fall.

Parking Survey

A comprehensive study of the parking problem in Seattle's Central Business District resulted in recommendations for the location of additional off-street parking facilities.

As a result of these recommendations private operators have developed facilities at two of the locations recommended for additional off-street space by the survey.

TRAFFIC SAFETY LIGHTING

By Bruce R. Culver (Jun. Mem., ITE)
Associate Engineer — Traffic

For nearly two decades following the "Roaring Twenties" and the "White Way" ornamental lighting systems, little was done in the City of Seattle toward providing adequate street lighting for the faster-moving, rapidly-growing traffic stream. The Traffic Engineering Division was able to install more adequate lighting at only a few of the night accident "hot spots." In 1948, the voters, recognizing the need for modern traffic safety lighting, approved a four-million-dollar lighting program. That program, which contemplated the installation of mercury vapor luminaires on over 330 miles of Seattle's street system, and which was laid out by the Traffic Engineering Division and sold with the aid of the City Lighting Department, got under way in 1949. This is the greatest mileage of mercury vapor lighting being installed by any city in the United States.

The lighting plans, prepared by the Design Division of the City Engineering Department, are submitted to the Traffic Engineer for approval. The installation of the lighting units is performed by both contract and day labor and maintenance is assumed by the City Lighting Department. To date over 7,400 mercury vapor luminaires have been installed on over 145 miles of streets.

Limited before-and-after studies have been conducted on nearly seven miles of streets where mercury vapor luminaires have been installed. Similar 16-month periods before and after the lighting installations show a reduction from 0.58 to 1.0 before, to 0.47 to 1.0 after, in the night to day accident ratio; a reduction from 1.14 to 1.0 before, to 0.89 to 1.0 after, in the night to day injury ratio.

In addition, the Traffic Engineering Division has made a practice of installing mercury vapor luminaires at all newly channelized intersections since 1946. The Traffic Engineering Division continues to keep abreast of the latest developments in street lighting through the installation, study, and field testing of experimental lighting units. As an instance of this, two flourescent luminaries were recently installed for field testing at a wide intersection having a relatively heavy pedestrian volume. The field testing is not yet complete but limited observations have shown that there are definite advantages to this type of lighting.

Expressways and Freeways

As has been stated in the prologue, Seattle's central business district is located near the center and narrow portion of its hourglass figure which in turn is superimposed on a series

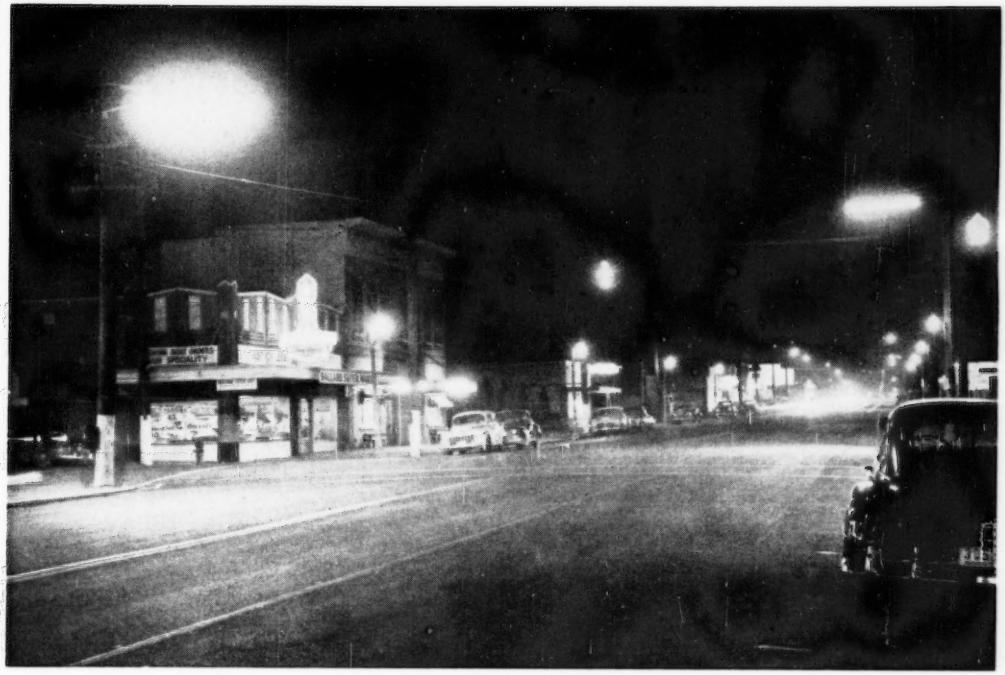

Fig. 3
Experimental Fluorescent Street Lighting
(Note mercury vapor luminaire installation two blocks away)

of hills. The result of this topography is a decided throttling effect at the city center on the preponderant north-south traffic movement. To quote from the "Origin Destination Traffic Survey," "The provision of one or more free-flowing arterials through this throat or throttled area will have an effect much the same as enlarging the size of the aperture at the center of the hourglass wherein the flow of sand increases rapidly."

Over the years there had been many proposals, even to tunnels under the central district, for the relief of this throttling effect. In 1946, the factual information for the determination of the most convenient and economic location of a system of routes was provided through an origin-destination survey. The completion of that survey signaled the start of a program of highway planning, design, and construction which will extend far into the future. Envisaged in this program is the construction of nearly 40 miles of expressways and the reconstruction of over 40 miles of connecting and feeder arteries.

In 1947 design was begun on the Alaskan Way Viaduct route, and in the latter part of 1952 over two miles of this route will be opened to traffic. This six-lane viaduct, a double-decked structure for most of its present length, parallel's the waterfront and westerly edge of the central business district. Although there will be no direct access to the central district in the present stage, it is estimated that the viaduct will divert 20 per cent of the north-south traffic now traveling through the central business district.

A subway is soon to be constructed which will connect the Alaskan Way Viaduct with U. S. 99 on Aurora Avenue. In the stages to follow, four ramps will be constructed to provide access between the central business district and the Alaskan Way Viaduct, as well as the extension of the viaduct to the South City Limits to connect with U. S. 99.

In the preliminary design stage is a freeway fifteen miles in length, whose route lies on the easterly side of the industrial district and the central business district. Preliminary estimates have placed the cost of this project in excess of $100,000,000. To form the southerly leg of the inner circumferential, the "Floating Bridge" route, U. S. 10, will be extended to connect with both the freeway and the Alaskan Way Viaduct. To complete the inner circumferential a route will be constructed connecting the freeway with Aurora Avenue at the northerly side of the central district.

The Traffic Engineering Division furnishes the traffic data necessary for the design of these major facilities and makes recommendations with respect to their geometric design and location.

1952 Annual Meeting

Make your plans *now* to attend the ITE Annual Meeting, September 8-11, at the Sherman Hotel, Chicago, Illinois.

Traffic Relief Through Modernized Management*

By D. Grant Mickle (Mem., ITE)

Director, Traffic Engineering Division, Automotive Safety Foundation

OPENING UP OUR congested cities for freer movement of vehicular traffic—in the face of generally antiquated streets and record-breaking travel volumes—poses a supreme test of sound management.

Unfortunately, in most cases the organizational structure for administering the facilities is as seriously deficient as the street plant itself. In fact, administrative weakness lies at the core of much of the traffic muddle. Scattered responsibilities, split authority and scrambled organization seem to be the earmarks of this vital phase of public administration in most of our cities today.

Two things have brought about this condition. One is that the revolutionary expansion of automobile use took place within the brief span of about a single generation. The jump from a fad to a motorized economy occurred too quickly for the development of an effective administrative pattern in the street and traffic field. The second is that few cities therefore have given due weight to traffic problems in formulating their basic law.

In the case of older municipal services, such as water supply, welfare and public works, unity of administrative structure and centralized authority are provided for in the City Charter. Few cities have given Charter recognition to street and traffic management as a major municipal function, with the attention and stature accorded to long-established departments.

Instead, responsibilities in this area have been parceled out, as occasion arose, among existing municipal agencies. Usually, the new duties relating to street development or operations were assigned to departments having functions superficially similar; or to those which could serve as a convenient "catch-all" for miscellaneous chores. Thus traffic engineering, incorrectly viewed as a regulatory rather than as an engineering and operational function, was almost invariably delegated to the Police Department.

Such diffusion naturally resulted in divided authority, duplicated effort, conflicts and other inefficiencies. Desirable physical improvements, even those of a minor nature, may get hung up indefinitely as the proposed project is shuttled back and forth from one municipal agency to another. Moreover, proper correlation of physical improvements and traffic operations becomes a virtual impossibility.

By the same token, lack of a centralized agency makes it difficult to carry on effective liaison in highway matters with other jurisdictions. That's important, since modernization of arterial routes often demands cooperation of other levels of government—county, state and federal. The present set-up of municipal street agencies provides no focal point for sound inter-governmental relations, which of course are essential not only in planning of facilities, but in joint financing, acquisition of rights-of-way and contract-letting.

Meanwhile, the cities are faced with the almost insuperable task of accommodating the biggest traffic volumes in history on streets which, in most respects, are little changed from horse-and-buggy days. The penalties we all know—incessant traffic jams, accidents, decline of downtown business, disorderly decentralization, loss of municipal tax revenues and urban blight.

When Detroit asked the Automotive Safety Foundation to make a factual appraisal of the city's street and traffic management, I had some idea of the weaknesses we could expect to find—both from my prior experience as Detroit Traffic Engineer, and from studies in Los Angeles, Albuquerque and other cities in which I participated as Foundation consultant. However, in this instance we conducted for the first time a preliminary survey of legal responsibilities, and the amount of diffusion revealed was a surprise even to me.

If more cities would take the trouble to review their legal provisions for street and traffic functions, they would discover much about the root causes of their traffic ills that they never suspected. Furthermore, the findings would be a great stimulant to correction of present organizational defects.

Over the years, as problems have arisen requiring official decision and action in street matters, they have been met by diverse ordinances, executive orders and administrative practices. The net result in Detroit has been to scatter varying degrees of control and activity among many different agencies, not counting the Mayor and Common Council. We don't have time here to examine the entire list, but one example—the Department of Public Works—will suffice as an illustration.

By Charter or ordinance, Public Works was given authority to pave and repave streets; establish grades; issue permits for excavations, or for moving buildings; appoint the City Engineer; approve curb cuts, driveways, etc.; review

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and approve (with the City Planner and Traffic Engineer) plans for street widenings, condemnations and any new street projects.

The point to be noted is that these duties vie with a host of other Public Works responsibilities far removed from the traffic field—ranging from construction, maintenance and repair of docks, breakwaters and public sewers, and supervision of garbage collection and disposal, to maintenance of public buildings.

We found much the same story in the case of the other agencies. Where the added street and traffic duties were not unrelated to the principal work of the unit, they were fractional—shared with other agencies—and the activity often carried on merely as a sideline.

One of the quirks of this illogical dispersal was that the Traffic Engineer, who is charged with achieving the most efficient use possible from the city streets, was assigned no legal interest whatever in the planning, design and construction of these facilities.

With this unwieldly managerial structure, even a relatively minor improvement like a median strip involved a highly complicated procedure. In order to get the actual physical work under way required almost interminable inter-departmental actions.

Actually, though a coordinated approach was not provided for by law, it was attained to some extent through administrative practice and cooperation of the respective agencies. Such voluntary cooperation manages to get work done, even though it may entail circumvention of the legal provisions. It is coordination through personalities rather than through law, and in any case has no assurance of continuity.

One of the more glaring omissions we found was the failure to make a specific agency legally responsible for the development, design and programming of a master street plan. Without a master plan—and the authority to carry it forward—it is difficult to budget expenditures prudently for even individual improvements, let alone a comprehensive street program. Traffic is a decisive factor with respect to locations and mutual relations of the various community activities. The master street plan, therefore, can exert a powerful influence in defining neighborhoods, stabilizing land values, controlling abnormal decentralization and rectifying the jumbled land uses that have generated so many of the average city's headaches.

It is apparent from the foregoing that the first step towards the upgrading of street and traffic management is to streamline the present amorphous structure and integrate the essential functions. What are these functions? Basically, there are six: traffic planning, traffic operations, parking, design, construction and maintenance.

It is obvious these functions are intimately related. They are all part and parcel of the total operation, and none can be performed in a vacuum by itself.

Let's pause a moment to examine the functions more or less in their natural sequence. First, traffic planning. The stock-in-trade of planning, of course, is facts—facts on travel habits, on driver behaviour, on traffic characteristics, on every phase of street movement. The use of facts takes street and traffic administration out of the sphere of personal opinion and places it properly among the other technical functions of municipal government.

The scope of planning ranges from area-wide origin and destination surveys to specific studies of accident causes, speed and delay checks and individual investigations of complaints. With the resulting data, it is possible to determine existing or required street capacity, and to classify streets into manageable systems—so that they receive their due share of attention and priority, in proportion to service rendered or anticipated. The data also provides an index of off-street parking needs.

The facts developed by traffic planning also serve to determine the geometric design of streets, grade separations, ramps, driveways, channelization, etc., to best fit the physical facilities to the demands of traffic, the characteristics of vehicle operation and driver performance.

Logically, too, part of the planning function should be the development of the master street plan, in coordination with the over-all city plan. The planning activity should likewise be integrated with traffic planning conducted by the State Highway Department, as well as county and regional planning agencies.

Next we come to traffic operations. This function translates traffic facts into improvement measures designed to make present street facilities operate as safely and efficiently as possible. Embraced in the operations phase are all the recognized techniques of traffic engineering, including curb parking controls, turning and speed regulations, one-way streets, routing, channelization, traffic control devices and so on.

Operations should also include the issuance of permits pertaining to the use of streets. For instance, maximum service from the facilities cannot be obtained unless there is effective regulation of taxi stand locations, loading zones, transit routes and stops, and detours. The function must also concern itself with the location and size of curb and parking lot entrances and exits; also with arrangements for street openings and closings. Unusual uses of the streets likewise comes within the same function, including parades, carnivals, special events, operation of over-size and overweight vehicles, and the temporary storage of construction materials on the street—in fact, anything that might tend to disrupt the free flow of traffic.

Parking is another basic function, being closely allied to the problems of traffic operations and design. We know that restriction of curb parking cannot be made effective unless suitable space is provided for storage of vehicles off the street. Thus the determination of off-street parking needs and the planning, design and location of required facilities becomes the special province of the parking function.

The Detroit study showed that control of parking was divided between the Traffic Committee and the Traffic Engineering Bureau; whereas responsibility for the planning of off-street facilities was shared between the Municipal Parking Authority, the City Plan Commission and the Traffic Engineering Bureau.

Experience seems to indicate that the parking troubles of our cities can never be cured by the piecemeal remedies

of the past. Possibly the best hope for a lasting solution lies in the concept of a city-wide parking system—that is, all phases of parking brought together as an integral responsibility. This step becomes perfectly feasible with consolidation of street and traffic management as a whole.

Next is the design function, which comprises the development of construction plans and specifications for streets, bridges, grade separations, channelization and other street improvements and changes. It is within the scope of this function to determine and maintain official grades of all the aforementioned facilities and, in cooperation with the operations unit, to review and approve curb cuts and driveways. Its work also includes preparation of official maps of the street plant and related facilities. Properly, too, it should handle design of traffic control devices.

An obvious advantage of a unified design function, operating under a consolidated street and traffic administration where the thinking is wholly geared to traffic matters, is that design would be specifically attuned to transportation requirements. Creative design would more closely reflect the needs of capacity, convenience, safety and other factors. In addition, design production efficiency would be enhanced.

The fifth essential function is construction. The construction unit has the responsibility to see that plans providing for new streets or alleys, street openings, channelizations and median strips are carried out. In improvements like street widenings, paving of unsurfaced streets and the construction of sidewalks, it should perform the actual work.

The construction function should review pavement and curb cuts to insure they meet specified construction standards, and carry on inspection of all paving jobs. It should also handle the installation of all traffic control devices.

And finally there is the maintenance function, which concerns itself with resurfacing of streets, repair of streets, bridges and grade separations, removal of snow and ice, and street cleaning. It should also have charge of upkeep of signs, signals and parking meters, and see that pavement markings prescribed by the operations unit are properly maintained. Unless this broad function is carried out with the utmost efficiency, excessive maintenance costs cut deeply into the budget available for street improvement, leaving far too little for new facilities that may be needed.

Lack of integration in maintenance work tends to increase the chances for waste. For instance, lane lines freshly painted one day might be covered up a short time later by a resurfacing job. A reasonable degree of cooperation between different agencies does reduce the possibility of such occurrences, but a centralized function would eliminate it entirely.

These, then, are the six functions which should be considered as integral cogs in the machinery of street and traffic management. To the degree that these related elements can be made to mesh smoothly and efficiently, to that degree will the public be afforded the quality of highway transportation which modern urban life demands. Not only will consolidation help to step up efficiency, but in addition it will permit optimum use of labor force, expedite the total work program and advance street development generally.

The states demonstrated long ago that close coordination of physical improvements and traffic operations is a practical necessity. The basic functions I've outlined here have been soundly integrated in the State Highway Departments, and the union perpetuated by statute. Highway administration is not only recognized as a major function of state government, but it shares cabinet status with the other ranking departments of the state.

With all these considerations in mind, the pivotal recommendation in the Detroit study was therefore to create a new Department of Streets and Traffic, bringing these functions together and providing adequate authority to discharge them by means of a Charter amendment. To direct the department, a four-man Commission was suggested with terms on a staggered basis to insure continuity of policy.

The plan called for a General Superintendent, serving directly under the Commission, to have charge of two main Bureaus. Under the Bureau of Traffic would be organized the functions of traffic planning, operations and parking; under the Bureau of Streets, design construction and maintenance. Each Bureau would be headed by a chief engineer, fully qualified in his special field.

The report pointed out that staffing of the Department could be accomplished almost entirely by shifting technical and clerical personnel and labor force from agencies then performing these duties.

The notable thing about the new administrative structure as proposed, was that it would reduce from 15 to 5 the number of agencies (other than enforcement) having important collateral activities in the street and traffic field. That in itself suggests the potential gains in efficiency and economy.

It is gratifying to report that Detroit acted promptly on the recommendations adopting a major portion of them. The city enacted a Charter amendment creating a Department of Streets and Traffic, and while the consolidation does not include construction and maintenance functions, it does assign all planning and supervisory authority to it. The Department has paramount control over all matters affecting traffic, including the establishment of standards and priorities for the work of other departments concerned with traffic. Moreover, under the new structure, traffic engineering is given the dignity and importance of chartered status.

All in all, the Detroit action is a long step forward, and should help immeasurably to improve the handling of highway transportation problems in the Motor City. I feel certain that as time goes on, more and more cities striving to make headway against traffic congestion and accidents will follow Detroit's example and take similar steps to modernize their administrative machinery. Street and traffic management is one of the most important areas of municipal administration today, and I know of no phase where improvement would result in such substantial benefits to our motorized economy and the public welfare.

Considerations Affecting Surface Mass Transit Routing

By Paul L. Ristroph (Mem., ITE)

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This paper was prepared as the basic outline for a general information presentation to the Planning Advisory Committee of the New Orleans Planning and Zoning Commission as assistance in preparation of the Mass Transit portion of the Master Plan for New Orleans. Although Mr. Ristroph feels it needs "dressing up" for publication he graciously consented to it being presented in original form.

1. Scope of Paper

THE discussion herein concerns general planning for mass transit routing and the character of planned routes. A great many factors that have an impact on routing plans such as organization, finance, type of equipment, detailed scheduling technique and fare structures are not specifically discussed except as they are related to transit routes.

2. Basic Concept

In determining a plan for mass transit routing, it is well to keep in mind the objectives of mass transit. These are to provide low cost transportation along regular routes to groups or masses of people at a rate which will cover all costs of operation, including taxes and a reasonable return on investment. Low cost service is made possible by gathering a sufficient number of individual fares to defray the cost of service which would be excessive if individual, personalized service were to be furnished to each individual from origin to destination at the times desired. Thus it must be recognized that economical transit service is possible only where comparatively large numbers of people are to be moved over regular routes at a rate or rates of fare which will defray costs of operation including a reasonable return on investment.

The planning of mass transit routes must necessarily make provisions for unpredictable changes in the desires and needs of the majority of the users of the service. Since such planning can only be tentative, it must therefore be flexible. Opening of new thoroughfares, bridges, and causeways; development of new neighborhood centers and new institutions; requirements for growth and spread of industry; as well as changes in public needs all call for flexibility in planning so that public interest may be best served.

3. Public Interest

In order to attract the necessary patronage, mass transit must provide a service which is in the public interest. The public interest is served by providing service, to the extent permitted by economic considerations, between many points of origin and many destinations that is (a), safe, (b), convenient and (c), economical.

4. Safety

To limit the scope of this discussion, we shall not go extensively into the matter of safety, with its manifold considerations. However, the routing of vehicles, condition and type of roadways utilized, design features, traffic control measures are integral parts of safety and must be considered in the selection of routes having satisfactory operating features. The average bus requires a roadway that will bear its weight without failure under repeated use, especially at bus stop locations. The roadway should be wide enough in terms of vehicle lanes to provide the capacity needed. It should likewise provide a smooth surface and have adequate provisions for loading and unloading operations without undue interference to other traffic.

One of the most important safety features of a bus route is the traffic control exercised over it. Normally it should be a through street or major thoroughfare where access from side streets is controlled and where special control measures are in effect at major intersections. The foregoing factors will not be treated separately, but will be integrated into the other considerations, as will such factors as type of equipment, training of operators and other personnel elements that enter into safe mass transit operation.

5. Convenience

Let us then consider the element of *convenience*. This may be considered under the headings of *availability, rapidity, comfort.*

(a) *Availability*—Public transit availability is measured in the terms of time and place. Normally transit service is considered available as to place when it is not more than ¼ mile from the passenger's place of origin or destination. This is an approximate standard that has been developed through long usage. In thinly populated areas, or where there are limiting circumstances, a standard in excess of ¼ mile is acceptable. In densely populated areas, lesser distances may be realized—as in the case of convergence of lines in the central business district.

Availability as to time may be measured by different standards, all of which relate to frequency of service. From the economic viewpoint, frequency of service is determined by the number of people to be carried during any given period of time. This number of people is dependent to a considerable extent upon proper spacing of routes. If routes are located too close together, only long headways may be justified on individual routes. If fewer routes are used to serve the same area, more frequent service can be provided.

For reasons of convenience to the public, limiting head-

ways, or time between successive vehicles, may be established even though such limitation may cause uneconomical service to be provided. Under such conditions the loss caused by this uneconomical operation must be borne by the more profitable operations. In the final analysis, frequency of service is determined by public demand at the fares they are willing to pay to sustain such service.

(b) *Rapidity*—The time for a passenger to complete his transit trip is a highly important factor to him. It consists of the time spent on the transit vehicles and time consumed in effecting transfer from one vehicle to one or more other vehicles.

Time spent on the vehicle is influenced by length of route and speed of travel. Speed of the vehicle is limited by frequency and duration of stops, traffic conditions, fare collection and fare systems and, to some extent, by type of vehicle. In this study the features that concern us most are the selection of routes that are as direct as practicable and offer probability of rapid movement. Also to be considered is the possible time savings that may be effected through express service. Express service usually consists of the transit vehicle providing normal local service at the outer and inner ends of the line and through service on the intermediate portions except for stops at transfer locations. In order to justify this service, there must be sufficient patronage to provide full vehicles at reasonable headways. Express distances must be considerable so that a savings in time can be effected. Provisions must be adequate for interchange of passengers at transfer points. This latter condition does not ordinarily exist at highway grade separations.

Time consumed in effecting transfers from vehicle to vehicle are related to two factors: (1), the number of transfers, and (2), the frequency of service on the line or lines to which transfer is made. The factors which influence frequency of service have already been enumerated.

Let us consider minimizing the number of transfers required. Obviously, one way to accomplish through riding is to establish transit routes according to predominant passenger "desire lines," with consideration for movements other than the major one. Such routes may result in extremely long lines with an overabundance of service at their outer ends. This would be accompanied by uneconomical operation. One method that can be utilized within limits is "cut-back" service where some of the vehicles are turned back short of the end of the line. This practice results in unbalanced loading and may not be practical from the schedule and operating points of view. Serious consideration must be given to the effect of through routing on other movements—usually of a local nature, such as to schools and neighborhood shopping centers and local industrial and commercial activity away from the predominant movement. These movements should not be penalized to such an extent as to be almost prohibited.

(c) *Comfort*—Comfort is a public consideration that is affected by such factors as type of vehicle, smoothness of operation, loading standards, frequency of starting and stopping, and shelter where long waits and numbers of people are involved. However, it enters very little, if any, into this routing study other than in the character of roadways utilized, traffic conditions thereon, and physical arrangements for transferring passengers.

6. Economic Considerations

It is realized the public acceptance of mass transit is a most important economic consideration because it is reflected in patronage and in willingness to pay for the service rendered. However, in this discussion, the economics will be restricted to more tangible aspects. The measure of successful financial operation is whether or not the transit system earns an adequate return on its investment. A measure of cost of operation is cost per vehicle mile operated or cost per vehicle hour operated. Comparable figures for analysis would be, respectively, revenue per mile operated or revenue per vehicle hour operated. Let us then analyze these figures.

(a) *Revenue vs. Cost Per Vehicle Mile or Hour*—In order to increase the revenue per mile, it is necessary to increase the revenue or decrease the miles (or combination thereof) so that the total quotient is increased. Revenue as such (without change in mileage) can be increased by several means:

(1) Increase average fare per passenger, provided increase in fare more than compensates for loss of patronage due to increased cost.

(2) Increase patronage without other change.

(3) Combinations of foregoing so that product of passengers X fare results in net increase.

Of the three foregoing methods, item (2) and possibly item (3) are affected by routing of lines. Aside from factors already mentioned, patronage can usually be expected to increase as service is made available to more people. This may be brought about through routing to serve an increased density of population or to increase the populated area served without increasing the amount of service provided. Therefore, routes should serve densely populated areas and conversely should not serve sparsely populated areas, nor normally be routed closer than $\frac{1}{2}$ mile to each other, not closer than $\frac{1}{4}$ mile to physical barriers such as canals and railroad yards without adequate pedestrian crossing, nor immediately along the edge of parks where patronage can be drawn only from one side of the line.

Without affecting miles operated, cost of passengers carried may be decreased by increasing speed of operations thus providing the same number of seats per given period of time with fewer vehicles and permitting a decrease in amount of investment, equipment and labor. The route selected for use and traffic conditions thereon has a decided influence on overall speed of operations. Routes should be selected that have favorable characteristics for operation.

Miles of operation may be decreased through shortening of route, the use of cut-back or shuttle service, decreasing frequency of service in accordance with lessened demand during different periods of the day, or use of higher loading standards. Of all of the foregoing, the shortening of routes or their designation as shuttle or feeder routes are within the realm of this study.

The economics of *branch lines* follow the foregoing considerations, but vary somewhat in their application. When a main line is divided into two or more branches, scheduling

of service becomes difficult and much idle time of vehicles and operators may be the result, or else there is likely to be too little service on one portion of the route and a superabundance on other portions. For example, let us take a line with three branches. Each branch line may have a limiting headway of 10 minutes. Service requirements on the main line may indicate a headway of five minutes or 12 trips per hour. Yet the three 10-minute headways will produce a combined headway of 3 1/3 minutes, or 18 trips per hour. This would, in effect, require much more costly service than actually needed.

Even if service requirements are the same then the scheduling difficulties resulting from an attempt to mesh various running times and headways are considerable, flexibility is lost, and operations are likely to be more costly. If short and long legs are involved, there is also the probability of the long leg or branch being overloaded while operating on the common trunk line.

The economics of mass transit routings, as we have seen, involves a matching of service to requirements. The length of routes is an integral factor in this consideration. On short routes, service can usually be fitted to requirements so that only necessary service is provided. On long routes, requirements throughout the length of the route will usually vary. Since service provided must meet maximum needs, excess service is provided for portions of the long route; unnecessary miles are operated and cost per passenger served is increased.

(b) *Effects of Expansion*—There is a tendency to extend transit service to outlying areas as the community grows. Passengers from these outlying areas must be transported greater distances at a consequently greater cost, and diminishing rate of economic return. To continue such expansion without increase in fare is to court financial disaster as has been demonstrated in numerous instances.

One might then consider the possibility of increased fare to cover increased cost of operation. If all fares are the same (flat fare), the short haul rider is charged more than necessary and the long haul rider is subsidized thereby. This process can be, and in instances has been, continued to the point where short haul patrons either walk or turn to other forms of transportation. The transit system is then left with principally the long haul riders for whom service is more expensive. Under the flat fare system, this ultimately leads to further increases in fare and decline in patronage. Such a cycle, involving long routes and flat fares, may be repeated until financial catastrophe occurs.

Let us now look at a combination of short trunk lines, or possibly express lines, which operate close to the central business district, and which are fed by feeder lines. Service on such a system can be economically adapted to the needs of the passengers. Moreover, with the almost automatic classification of passengers into long-haul and short-haul categories, it is possible to more nearly relate the fare to the cost of service as indicated by miles traveled. This matching of fare to cost of service is the zone fare system.

Thus we can see that as the service area is increased, the use of zone fares, used in all other forms of transportation, becomes a necessity. Therefore, in the planning of transit service to an expanded area, transit routes, especially the length of the route, should be selected which facilitate the classification of long and short haul passengers for zone fare purposes.

7. Conclusions

In considering the foregoing, it must be borne in mind that it is not contemplated that every route be operated on a profitable basis. It is, however, believed that overall operation of all lines must result in sufficient revenue to permit of equity money being readily obtainable when expansion of facilities is necessary. It should be remembered that the cost of uneconomic routing and operation is borne by the public. The interest of the public, therefore, demands economy in routing and operation.

What, then, are the desirable characteristics of surface mass transit routes? Summarized:

(a) They connect by most direct route major points of origin and corresponding destination points, principally residences and major commercial and industrial centers.

(b) They provide reasonable facility for interchange to and from secondary centers such as high schools and colleges and neighborhood centers.

(c) Routes should not duplicate each other except perhaps where lines converge.

(d) Through routes should not be required to serve sparsely populated areas or pass through such areas for considerable distances.

(e) Each route should normally draw its patronage from areas within not less than 1/4 mile on both sides thereof, but in thinly populated or restricted areas, distances in excess of 1/4 mile become necessary.

(f) Routes selected should afford facility for rapid and safe movement of transit vehicles and must afford facility for interchange of passengers where transit lines of different destinations intersect. In this connection, savings of time through use of express routes can be realized provided higher average speeds can be maintained for comparatively long distances. Such routes must also afford opportunities for passengers to transfer. Moreover, there should be sufficient patronage to insure efficient utilization of vehicles at frequent intervals.

(g) There must be adequate provisions for turn-around at both ends of the line and for "layover" or headway adjustment at one end of each line.

(h) The combination of routes and service provided must meet public needs and overall operations must be capable of providing a reasonable return on the investment required.

(i) Since lines or routes are placed to serve the needs of the people which vary from time to time (not static), planning for routes should be kept flexible, so that adjustments can be made to meet changing needs as circumstances warrant.

Traffic, Parking and Petroleum Marketing

By N. H. Seubert

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This paper was prepared as the basis of a talk delivered at March 6, 1952 meeting of the New York Metropolitan Section of the Institute of Traffic Engineers.

I wonder how many traffic engineers realize that your profession has more than doubled in importance in the past ten years. This is another way of saying that the traffic problem is now more than twice as critical as it was ten years ago. There are a few figures which seem to indicate this, namely, that in the ten-year period the total miles of roads have only increased 1%. At the same time, population has risen about 16%, motor vehicles have increased 51% and last, but probably most important, the highway gasoline consumption has increased 61%.

In addition to the increased demand on the highways beyond the slightly increased facilities, we have other factors which have materially increased the critical nature of the traffic problem. For example, horsepower and driving speeds of cars have materially increased. Congestions at critical places due to excessive street parking have further added to the problem. As a matter of fact the parking space requirements for automobiles calculated at 375 square feet per car show an increase in ten years of 6¼ billion square feet. These facts seem to indicate that the traffic and parking problem have more than doubled in the past decade.

Evolution of the Traffic Problem

Thirty years ago automobiles were very delicate and temperamental instruments. Most of them were treated by their owners with the loving care that a parent would give a newborn babe. They were never parked in the sun; they were never parked out all night, and in the wintertime most of them were jacked up for their protection. Relatively few cars were used in the dead of winter. This meant that every car in those days had its garage. Providing for this garage was much cheaper than taking one's chances on losing his car completely or the possible deterioration loss due to weathering.

Today, however, largely because of better weathering protection in the bodies of automobiles, and the better protective enamels and finishes, as well as the high cost of construction of garages, the situation has been reversed. To the average person weather deterioration from outdoor parking, over and above normal depreciation that develops from this type of unprotected parking, is now so much less than the cost of protection that to this average car owner the payment for a garage at present rates becomes just another unnecessary expense. This attitude on the part of the public, so prevalent in big cities, has probably greatly increased the extent of all day and night street parking in most of our metropolitan cities.

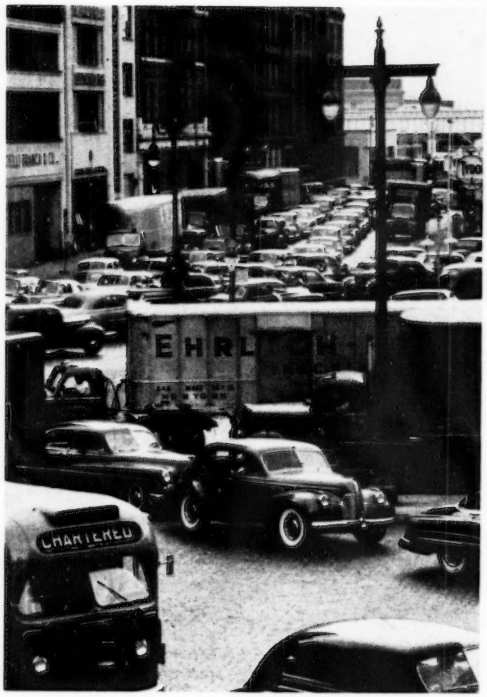


Photo Standard Oil Co. (N. J.)

Fig. 1
Friday afternoon traffic at New York approach to Holland Tunnel

This extra parking burden, in turn, has added to the overall traffic problem. New York City is a good example. To show how rapidly this parking problem can grow in just one year from 1950 to 1951, the parking space requirements in New York City were increased by 35 million square feet. Unfortunately for New York City, most of the cars which represent this increased requirement will know no other parking home but on the streets and avenues of New York City.

This ever-growing city congestion so typified by New York City has probably contributed rather heavily to the curtailment in the growth of the central cities and has resulted in the rapid increase and movement towards the suburbs. A few figures from the State of Connecticut seem to be quite typical of the movement as a whole. For example, the four metropolitan areas of Connecticut, when taken as a

composite, show the same pattern of growth as each one of the cities individually. Here is the pattern as it exists in Connecticut.

	Population	Car Registration
Central City increase of	5.7%	12.6%
Inner Suburbs (contiguous)	34.6%	51.4%
Outer Suburbs	21.8%	33.1%

This shift of population and cars to the suburbs has been the main factor in leading the big city stores in the establishment of branches in the suburbs. The growth of this movement is fairly fast. During the past ten years New York City department stores, as well as other large women's specialty stores have built 58 branches in the immediate suburbs. This movement of stores to the suburbs has in turn created traffic and parking congestions in the normal suburban shopping centers. Anyone who has tried to shop by car at any one of these centers will readily realize the truth of this statement.

These normal shopping centers in the suburbs having become highly congested as far as shopping traffic and parking are concerned, have led to another development, namely, the new type of "Off-Highway, One-Stop Shopping Centers." These centers are completely planned with easy access and adequate parking facilities. The growth in this type of center has been extremely rapid on the West Coast and in areas around metropolitan cities of the Midwest, as well as five or six big cities on the East Coast. Probably the most written about and probably the best known of this new type of center is the "Shoppers World" which is located on the turnpike near Framingham, Massachusetts, about midway between Boston and Worcester. Some of the general requirements that are slowly being formulated for this type of center are:

1. Referring to the large super type of centers, it should be located within 30 minutes driving time of a minimum of 500,000 population. For the smaller weekly supply center the requirements would be much less.
2. Dealer competition should be represented in these centers.
3. Complete shopping requirements should be covered in the center.
4. Parking space should be at least three to four times the gross interior space or selling space.
5. At least 375 square feet per car should be allowed for parking.
6. No part of any parking area should be more than 400 feet from the nearest shop in the center.

All the indications at this time lead us to expect more and more of this new type of "Off-Highway, One-Stop Shopping Center."

Importance of Traffic and Parking to the Petroleum Industry

Traffic is the one big major element of sustenance of the petroleum industry since petroleum is the major transportation fuel serving all kinds of mechanical transportation: airplanes, railroads, ships, automobiles, trucks and tractors. To give a better idea of the importance of traffic to each of the major petroleum products, I have a few estimated figures which indicate the percentage of the volume of each product in the industry that is used directly for traffic:

Gasoline	96%
Kerosene	33%
Distillate Fuel (Excluding Diesel)	3%
Diesel Fuel	55%
Residual Fuel	28%

making a total for all major products of over 60%, of which ⅔ may be directly traceable to highway traffic. The dollar volume and profit picture would accentuate the percentage even further. One can readily see, therefore, that the petroleum industry is definitely interested in traffic.

Typical Problems of the Petroleum Industry Affected By Traffic and Parking Conditions

Marketing problems of the petroleum industry frequently are affected by traffic and parking conditions. This is particularly so in any problems connected with service stations. The following are some of the various uses or needs of traffic data, along with some personal observations:

Traffic Count

In establishing the techniques for traffic count and the various types of data necessary for complete analysis, the study should include number of passenger cars, trucks and busses, the amount of traffic on the far side, as well as the near side and, wherever possible, some indication of origin and destination. This type of information should be gathered for a regular sampling of each hour of the day and each day of the week, as well as some indication of seasonal variations.

Traffic Speed

Traffic speed is a relatively new factor in the picture. Up until recently not too much attention had been paid to speeds. It has been found, however, that the chance of getting business from a flow of traffic can be affected materially by its speed. While it has not been proven as yet, speed of traffic is thought to affect psychologically the attitude of the drivers in the type of quick service they demand along the highway. There are a number of methods of calculating and recording the speeds of traffic flow, but the best method that I have seen is by means of electronics.

Here are a few personal observations about traffic speeds. If the traffic moves faster than 30 to 35 miles an hour, and if it is congested at the same time, the service stations probably will not receive the amount of business they would normally receive. In order to offset this handicap, service stations frequently take one or all of the following steps:

1. Provide additional frontage.
2. Locate on top of a hill or curve for:
   (a) Extra visibility
   (b) Braking effect on speed of automobiles.
3. Provide spectacular sign with good visibility.

Type of Service to be Rendered

Whether or not a station shall be self-service, partial service, or full service is largely determined by the type and the extent of passing traffic along with an analysis of the internal station traffic problems. These will influence greatly the layout of the station.

Station Location

In locating a service station one naturally has to have traffic figures broken down by the character of traffic, the speed of traffic for each type of location, namely, industrial, parkways, congested metropolitan areas and restricted residential areas. It can generally be said that stations located in residential sections sell a greater percentage of the traffic they are exposed to, while stations on boulevards with the greatest traffic concentration, sell the least percentage of their

traffic. Stations in industrial or business areas where people park their cars generally have a better sales to traffic ratio than stations on the highways leading to these areas. The numerical size of a city is not too important, but rather it is a question of:

1. Is the traffic restricted to a few boulevards because of natural topography? Examples: Manhattan or San Francisco.
2. Is the public transportation system adequate?
3. Is the traffic peaked, such as Detroit with frequent shifts at industrial plants?
4. Is the city zoned so that sites are difficult to obtain?
5. Is there very heavy seasonal traffic?

Dimensions of Property

Again the frontage and depth of property is a matter of individual site analysis but consideration should be given to these factors:

a. Speed of traffic since high-speed traffic would necessitate more frontage.
b. Arrangement of islands since parallel islands require more frontage.

The depth of property is affected by:

a. Anticipated parking or service area required.
b. The arrangement of pump islands.
c. The size and type of buildings.

On the East Coast and on some of the larger New Jersey highways, frontages have been as wide as 300 feet, while on the West Coast some of the companies are recommending an 87 ft. frontage for a 4-pump island self-service unit. There is a school of thought which believes that modern highway stations should have a minimum of 125 ft. frontage.

Station Appeal

In most high-speed highway locations service stations not only must have ease of entrance and exit but should give the appearance of accessibility.

Side of Street

At the present time there is no definite proof that we know of that one side of the street is to be greatly preferred over the other except in a few cases.

Inside Versus Corner Locations

Here again local circumstances really govern the situation. However, there is a growing belief that inside locations might be preferred over corner locations for the following reasons:

a. An inside location generally avoids congestion found at intersections.
b. It generally avoids back-up of traffic around street signal light which often blocks the driveway of a corner site.
c. It permits the driver to make up his mind regarding the purchase of gasoline without worrying about making the street light or jockeying for position to make a turn at a street intersection.
d. An inside location generally reduces a capital outlay for the site.

Number of Pump Islands

Since the number of pump islands determines the number of "service spots" available to a motorist and since an excessive number of pump islands is extremely wasteful, a great deal of study has been given to this subject. Generally speaking and under normal conditions the motorist will not drive into a station if there are no "service spots" open. On the other hand, it appears that the motorist does not object to waiting for service for a few moments if he has been able to park in a "service spot." It might be concluded that an ideal arrangement is to have enough pump islands so that there will always be a spot open. In some cases, however, this can be too costly for many stations have realized that too many islands cause undue strain on manpower. Yet, too few islands will bring about poor utilization of manpower, as well as equipment.

Photo Standard Oil Co. (N. J.)

Fig. 2
Marketing ice cream to heavy traffic. Note corner located gas station on left

The station offering "full service" may find that one attendant is able to handle one island. A station offering "partial service" may find that one attendant is able to serve two islands, while a "self-service" station may find that a cashier can handle four islands. The number of islands then must become an individual matter for the following items to be considered:

a. Available property
b. Peak traffic count
c. Type of islands
d. Type of service to be given

Parallel Islands

The parallel island is the conventional type of island that has been used by the majority of service stations during the past four years. Its advantages lie mainly in the fact that the motorist is educated to the use of this type of island. Its disadvantages stem from the fact that the "service spots" are easily blocked by motorists who all seem to have a tendency to stop at the first available position. This tendency has been minimized by various means such as the attendant motioning the motorist toward the proper island or else the installation of guide lines or signs for this purpose.

Vertical Islands

The advantages of this arrangement are many and their use has achieved popularity with the stations that are attempting to get the maximum number of "service spots" on their driveways. Some of the advantages are:

a. More "service spots" for better frontage.
b. Concentration of the work load of the dealer and his attendants, making for greater efficiency and less effort.
c. Reduction in investment by achieving a greater utilization of the frontage.
d. Prevention of customer's car blocking the entrance from other potential customers.

e. Ease of entrance for the motorist.

f. Unobstructed view of "service spots" available to approaching motorist.

Angle Islands

The angle island has the same advantage as the vertical island and, in addition, it is easier for the motorist to approach the "service spot" since the angle of turn is less acute. It approaches the natural turn the motorist makes when leaving the street. The major disadvantage is that the motorist approaching in the opposite direction must make either a very sharp turn to place his car, or he must go around and enter the "service spot" from the rear. The angle islands are best suited for thoroughfares where traffic is all going in one direction.

The industry has not had enough experience to say positively which type of island arrangement is the most efficient or has the greatest appeal to the motorist. The problem is important enough, however, to warrant further research and study.

A rough generalization of apparent advantages would indicate that on two-way highways with fast traffic and small frontage, the vertical angle is desirable. On two-way highways with fast traffic but large frontage, the parallel island is desirable. On one-way highways with fast traffic, the angle island is desirable. On two-way city street with medium speed, the vertical angle is desirable, and on one-way city street with medium speed, the angle island is desirable.

Economy of Operation

The economic operation of any service station depends largely upon the least amount of wasted movement within the station. This includes movement of personnel, as well as movement of vehicles. Any attempt, therefore, to improve the economy of operation must result from thorough analysis of internal station traffic.

Sales and Operating Districts and Divisions

Another possible use of traffic data is in the setting up or determining the divisional boundary lines, as well as district boundary lines for sales territories. We have made some studies in the past where we compared a flow of newspaper circulation with traffic flow and in most cases we found that the point of least traffic on a highway connecting two major cities would coincide with the point between those same two cities where the majority of newspaper circulation shifted from one city to the other. Expressing it another way: at the point at which the flow of newspaper circulation from one city met the flow from the other city. At this point we found traffic was to be lightest. Using this watershed method or principle, one is able to set up homogeneous communication and traffic areas which in turn may become logical sales districts. The newspaper flow method can be used as a check against the traffic picture and, in cases where traffic figures are not available, can be used by themselves to establish boundaries of these areas. It is interesting to note that on this basis most of the State of Connecticut with the exception of one northeastern county would fall in the New York traffic and communication area and not be included in the Boston area.

Location of Bulk Plants

Traffic again becomes an important factor in the location of bulk plants. The ability to distribute products from a given bulk plant to a large extent depends upon distances, road conditions and traffic so that here also traffic is an important factor.

Some Areas for Further Research

One of the problems of marketing research is to be able to evaluate markets for gasoline sold through filling or service stations. In order to do this we have been trying to evolve a simple fromula. What we hoped would be a simple formula is probably not going to be so simple and is going to need a lot more experimental research before the final answer is arrived at. The problem as a whole naturally divides itself into two parts:

a. The local market, that is, the amount of gasoline sold to the local customers in the area under consideration.

b. The transient market evolving from the sale of gasoline to all people living outside of the area under consideration.

The development of the local market potential figure is not too complicated nor too difficult. Since we have fairly accurate annual figures on car and truck registration by cities and towns, and by the use of average consumption figures, the local market potential can be calculated fairly accurately. But evolving a formula for the transient market needs a lot more research and study. The first approach that was taken to this problem was to try and determine the number of miles of roadway in any given township; also determine the 24-hour traffic count for each road. By multiplying the traffic count by the road mileage within the township, we have a total daily traffic miles of each road along with a total for the township as a whole. Comparing this total figure for each township with the total for the State, one could estimate the portion of the State traffic located within the township. This method, however, would be very costly and impractical, since traffic counts would have to be taken on every road in each and every township, and after the daily traffic miles were calculated, a realistic approach to determining the ratio of gasoline gallonage to daily traffic miles must be developed. This again would be very difficult and perhaps impractical since there could be no average nor typical ratio figure because of the fact that there is a wide variation of gasoline sales expectancy on highways depending upon the factors of nearness or distances from origin and destination points. A township straddling a heavily traveled through-highway but located very close to either the origin or the destination city would probably draw very little business from the traffic stream.

The second approach and probably a more practical way to approach the evaluation of the transient market is to study traffic generation or at least one of the chief factors in the generation of traffic, namely, business. One realizes, of course, that all traffic does not stem from business reasons; other reasons may be recreational, scenic and social. However, we believe that the great majority of regular travel stems from business reasons. Since business generates traffic, a study of the amount of business of each area would give the business results of traffic. If the total business per capita of each area within the State were compared with the overall State per capita, the extent that any area per capita exceeds the State per capita should indicate, in a general way, the amount of outside business that the area attracted.

In order to validate this theory a study should then be made in a number of townships of various types of locations and sizes, covering all the incoming traffic, as well as traffic in the center of the township. In enumerating this traffic, attempts should be made to determine the following:

a. Proportion coming from out of the State.
b. Proportion coming from out of the county.
c. Proportion coming from out of the township.
d. Amount of local traffic.

In addition an analysis of the sales of all the filling stations located in the townships under study should be made in order to arrive at the proportion of business from local consumers to business from transient consumers. With this data at hand and with adequate sampling, a formula might be developed that would translate the business per capita figure into a realistic transient market potential.

Another problem that I feel should be given a lot more study is the effect of varying highway speeds upon highway business. How far ahead in seconds should the notification sign, "Gasoline Service Station Just Ahead" be placed in order to allow time enough for the prospective consumer to pull out of the traffic stream and enter the station? Another question is, "How long should deceleration and acceleration entrance and exit lanes be?" "Should they be geared to present highway speed or should they allow for increased speeds of the future?" "What is the psychological effect of speed of the traffic stream on the customer in his demand for service?" "Will 60 miles an hour traffic condition the customer so that he demands 60 miles an hour service?"

Another important subject which I believe needs further research along with the speeds of traffic is traffic densities; their effects on sales, arrangement of station, type of service and type of entrance and exit. Further research is also called for on station operation efficiency with a view to possibly changing the whole conception of present-day layout in order to produce greater efficiency and less waste motion at the station. I am one who believes that the ultimate service station has not been designed as yet. The question is how can more people be more quickly and efficiently served with the least amount of wasted traffic movement within the station. For example, it has been estimated that in our present-day average station an attendant walking back and forth from the service station building, as he usually does after each sale made by him at the island would walk 50 unnecessary miles a year. It is also important to determine how service station congestion can be reduced without materially increasing the size of the lot and, of course, without reducing the number of customers.

To what extent does service station congestion affect the service and sales on customers already in the station, as well as how does the appearance of congestion affect the number of cars entering the station? In other words, how much business is lost through congestion or the appearance of same?

A Look to the Future

It seems to me that some of the things that I believe are about to take place in the future and some of the things that I believe *should* take place in the future might be of some interest.

1. I believe that there will be a further trend towards decentralization of population.
2. I believe that in the designing of these one-stop shopping centers and the designing of new service stations of the future, as well as bulk plants and warehouses that the principle of the octagon or hexagon designs will become more and more appreciated for saving space, as well as curtailment of internal traffic.
3. I also believe that we will have more throughway toll highways but that these toll highways of the future will have a much greater variety of business enterprises along them and that the local merchants from the county or state through which the highway passes will have a better representation.
4. I believe that merchants and highway users will eventually become better informed as to the fact that good roads actually are money savers. The following table illustrates the results of research on this subject, showthe affects on motor car operating expenses on gravel and dirt roads compared to paved roads.

	Paved	Gravel	Dirt
Gasoline Consumption	100	115	111
Oil Consumption	100	136	190
Tire Consumed	100	163	122
Other Expenses	100	560	1010
Total Upkeep	100	150	170

5. I believe also that traffic speeds will keep on increasing as long as automobile manufacturers keep on increasing the horsepower of automobiles. For example, this last year the horsepower of leading manufacturers' cars have been increased as follows:

Chrysler — An increase of 45 horsepower
Cadillac — " " " 30 "
Buick — " " " 18 "
Ford — " " " 10-13 "

These facts should be taken under consideration in the construction of new highways-deceleration lanes and acceleration lanes, etc.

6. I predict that eventually State authorities and traffic engineers, along with the commercial companies that use traffc information will evolve some form of standard rating system for roads which would immediately catalogue them correctly for a number of characteristics.
   a. By the amount of traffic.
   b. By the average speed of traffic.
   c. By the type of road; whether it is toll, public, state federal or county.
   d. By the type of surface; asphalt, concrete, dirt or gravel.
   e. By the design of road; whether it is 1-2-3-4-lane, one-way, or two-way traffic, etc.
   f. By the origin of traffic; out-of-state, out-of-county, out-of-town, and local.

Forgive me if some of these ratings are now in use in some places, but I believe that such an overall rating system would have many advantages for all those people who use and depend upon traffic information. This might be a project that traffic engineers could advocate and perhaps sponsor.

7. Since cities beyond a certain size grow vertically or up in the air, rather than laterally, it is conceivable that parking facilities, as well as traffic facilities not able to expand laterally must also keep pace through vertical growth. This would mean that in the future sometime it is quite possible that a city like New York, with its tremendous vertical growth of skycrapers, would have to consider 2 or 3-layer highways.
8. Since parking is such an important factor in the traffic problem, particularly in cities and, since the high cost of parking is such a deterrent to the use of park-

(Continued on page 377)

Performance Test of Pavement Marking Materials

By Robert A. Burch (Mem., ITE)

Traffic Engineer, North Carolina State Highway Commission, Raleigh, North Carolina

As Traffic Engineer of the North Carolina State Highway and Public Works Commission it is my responsibility to try to procure pavement marking materials which will be the most beneficial for each dollar expended. Not unlike many other governmental agencies, for many years we purchased pavement marking materials on the basis of formulation specifications and lowest cost per gallon.

As you know most every State Highway department feels that they have the best formula, yet there is considerable variation in durability and performance shown by the materials purchased under each of these many specifications. More alarming is the fact that materials purchased under the *same* specifications vary tremendously from year to year.

The traffic engineer or the maintenance engineer has been allocated or budgeted certain monies to be spent for pavement marking materials. Along comes the purchasing agent who makes an award on lowest price per gallon—spends the traffic or maintenance engineer's money and leaves him with the problem of how it performs. If it doesn't wear well the traffic engineer or the maintenance engineer must make repeated applications and be subjected to criticism, official and otherwise, and be unhappy with a line or marking of low average quality.

The Problem

It appears that the problem could be boiled down to a few pertinent factors.

1. Is the material the desired color and does it hold that color?
2. Does the material handle well? Is it easily mixed? Does it apply well?
3. Does it have reasonable drying time?
4. Is it durable?

These questions say, in effect, we don't care how the material is made but rather, how does it perform? We are not involved in designing a paint. We are putting the burden on the manufacturer to produce a durable, well-performing material for the lowest cost. So, the problem, so far as the traffic engineers is concerned, appears to be—what kind of yardstick can we use to determine performance for the purpose of making awards for pavement marking materials.

Performance Test Recommended

It was decided that the best testing method is to apply pavement marking materials supplied by the vendors to a heavy traffic volume highway. These markings to be applied transversely in order to get accelerated wear and shorten the required time of test.

It was anticipated that this test will provide a numerical value of relative performance which can be used as a basis of award with much more accuracy as to the true value of the material than its chemical composition and price per gallon.

Application of Materials

It was decided to apply the test by the same general method of marking currently used by the State Highway Commission, namely, an air pressure spray gun arrangement. All materials were applied on the same day with weather conditions being substantially the same for all.

Realizing that it would be a laborious and tedious job to attempt to apply all materials at exactly the same film thickness, it was decided to load the machine with a one-gallon sample of a given material, adjust the pressure, etc. to obtain a line as close to the desired uniformity and thickness as visually possible—then to apply the transverse lines across the pavement. The material remaining in the tank was run out longitudinally at the same pressure as was used on the transverse lines. The length of longitudinal line was measured and added to the combined length of the transverse line to give the figure of footage covered per gallon of material.

It was realized that others have used methods approximating laboratory control in the making of "field" tests and I say "field" advisedly—however, it is open to question whether it is realistic to make "field" tests with a degree of "fineness" which can never be achieved in the practical every day use of the material. That is the proving ground where the reckoning of the money spent for it takes place.

Rating of Performances

The method of rating the materials was the nationally known system, as follows:

10 Perfect or absence of failure
9, 8 and 7 Good or slight failure
6, 5 and 4 Fair or intermediate failure
3, 2 and 1 Poor or bad failure
0 Complete failure

These ratings were applied to the factors of General Appearance, Color, and Film Condition. Numerical photometric readings converted to a scale of 0 to 10 were used for reflection. The ratings for General Appearance, Color and Film Condition were obtained by periodic visual inspections. Ratings were made by graduate students and instructors at N. C. State College who had no knowledge of the identity of the materials. When a line reached a rating of "3" in any one of the above factors it was considered to have terminated its useful life.

Analysis, Evaluation and Application of Performance Ratings

It was intended to determine the "cost per foot per day of useful life" for each material. To do this it was necessary to add to the cost per gallon of each material the application cost per gallon and divide it by the number of days of useful life and the footage per gallon for each material:

$$\text{Cost foot per day of useful life} = \frac{\text{Cost of Material per Gallon} + \text{Cost of Application per Gallon}}{\text{Days of useful life} \times \text{Footage covered}}$$

Up to this point we seemed to be getting along fine—that is if we waited for each material to wear out—to reach a rating of "3". If it had been necessary to wait until each line reached a rating of "3" the test would have lost its usefulness as a "tool" to aid in the purchasing of materials in the early spring in order to be ready to start marking as soon as weather permits.

Therefore, it was necessary to employ a means of extrapolating to determine the expected remaining life of those lines which had not terminated their useful life.

To do this we assumed:

1. A perfect line has a rating of 10.
2. A line needs replacement when it has a rating of "3".
3. Within practical limits the depreciation of a line from a rating of 10 to a rating of 3 is a straight line proportion.

Expressed as a formula this becomes:

$$\text{Cost per foot per day of useful life} = \frac{\text{Cost of material per gallon} + \text{Cost of Application per gallon}}{\text{Days of test} \times \frac{Rp - Rr}{Rp - Rn} \times \text{Footage per Gallon}}$$

When

Rp = 10 — the perfect rating
Rr = 3 — the replacement rating
Rn = the rating now

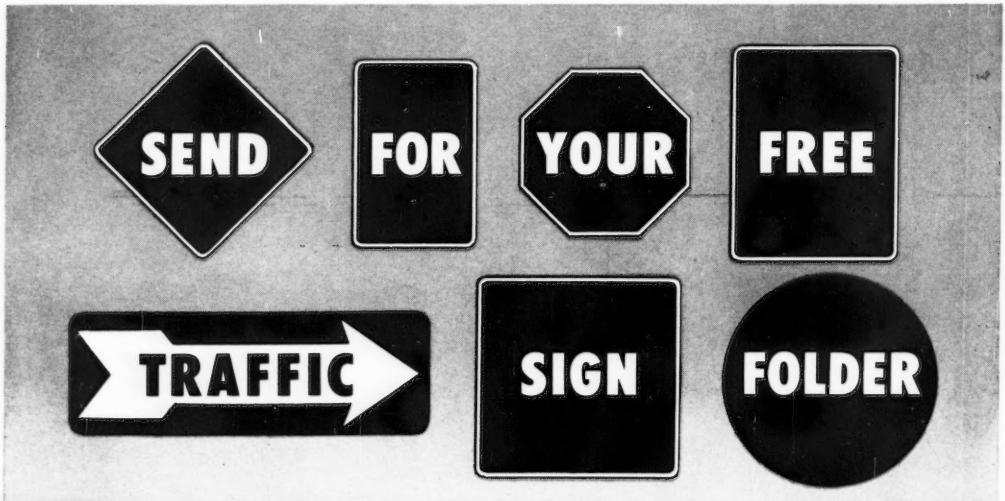
Thus we arrived at a numerical value of cost. The material showing the lowest cost in these terms was the material purchased.

Conclusion

It is practical to make awards for the purchase of pavement marking materials on the basis of performance. Additional study and research is needed to develop a more convenient practical field method for evaluating the performance and characteristics of materials, such as:

a. The development of a reasonably priced, sturdy, direct reading photometer.

b. The development of a special test striper with particular consideration given to lighter weight, more rapid method of tank cleaning and more practical method of handling small quantities of pavement marking materials.



LYLE SIGNS, INC.

2723 UNIVERSITY AVENUE SOUTHEAST
MINNEAPOLIS, MINNESOTA

Do you have the Lyle Sign Manual B-48?

● Please send me a copy of the latest Lyle Traffic Sign Folder

*Name*_____

*Office*_____

*Town*_____ *State*_____

Characteristics of Left-Turning Passenger Vehicles

Lawrence E. George

Signal Engineer, Oregon State Highway Department

A research project analyzing the characteristics of left-turning passenger vehicles was conducted during the 1950-51 academic year at the Yale Bureau of Highway Traffic. The results, which were published as a thesis, have also been presented in their entirety as a paper at the thirty-first annual meeting of the Highway Research Board and will be published complete in the 1951 proceedings. Following is an abstract of results derived from the study of left-turning passenger vehicles.

GENERAL characteristics of left-turning passenger vehicles have proved to be of current interest to those connected with geometric design. The study locations chosen provided two basic conditions; namely, 90 degree alignment of the vehicle to the intersecting road, and a zero vehicular speed at the beginning of the turn. Data collection was made by the photographic method as developed by Dr. Bruce Greenshields.[1] Both rural and urban locations were chosen for the study.

The wider range of turning speeds was found to occur at the urban location. The 85 percentile value at the urban location was found to be 21.4 miles per hour, while at the rural location the 85 percentile value was 16.9 miles per hour.

The maximum acceptable side friction factors displayed a reflection of the speed characteristics in that the frequency distribution curves were of the same general shape as those for speed. This suggested that the minimum radii occurring within each speed group must remain nearly constant for the range of speeds observed at each intersection. It is of importance to note that of the total sample only one-third of the drivers used a side friction factor lower than or equal to the generally accepted comfortable value of 0.16.

The paths of the left-turning vehicles could not be expressed mathematically as second or third degree equations. Both the front and rear wheel paths took the form of a transitional spiral. Front and rear wheel paths blended from transitional spirals at either end of the turn into a central circular arc. The minimum turning radii were found to occur within the first 30 degrees of the 90 degree directional change. In all cases the shorter radii transitional curves were at the beginning of the turn, with the longer radii transitional curves occurring at the end of the turn.

A correlation of turning paths with speed groups at each intersection proved that the shape of the turning paths remained approximately constant for speed groupings at each intersection. However, comparing similar speed groups at both intersections revealed a difference in the geometric shape of the turning path. This precluded any attempt to make a general formulation that would enable prediction of turning paths on the basis of speed.

The characteristics of transverse placement at the beginning and end of turning maneuvers were constant for all samples observed in the study. Transverse placement from the curb at the beginning of the turning maneuver increased with increased speed while at the end of the turning maneuver it remained constant for all speed groups.

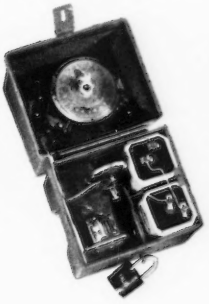
Evidently the drivers used some common criteria to position the vehicle at the completion of the turn. Investigation showed that final transverse placement with respect to the roadway cross-section features was such that an immediate lane change was possible.

(Continued on page 376)

[1]Greenshields, B. D., *The Photographic Method of Studying Traffic Behavior*, Proceedings of the 13th Annual Meeting of the Highway Research Board.

PERIOD COUNTER

The Period Control Traficounter (model PC) is a portable, automatic counter designed for use with a pneumatic type road tube. The special feature of this model is its ability to receive counts during any portion or period of the day.



It may be turned on and off automatically at predetermined intervals. Thus a set of *Period Control Traficounters* may be correlated by a single operator and readings taken at any convenient time.

The Period Counter is made to give only one count for every two vehicle axles to pass over the road tube.

STREETER-AMET COMPANY

1726 Belle Plaine Avenue • Chicago, Illinois

Reference Notes

Nomograph for Curve Radius Determination

By J. M. Keneipp

Research Assistant, Traffic Institute
Northwestern University

Given the chord of less than 100 feet, and middle ordinate, the approximate radius of a circular curve may be readily determined from the nomograph shown as indicated by the following example:

Example:
Use the same measurements as in the previous example; chord 50 feet and middle ordinate 1 foot. Find the chord, 50, on the left scale, C. Find the middle ordinate, one foot, on the middle scale, M. Draw a straight line from the 50 on scale C through through 1 on scale M to scale R. Read the radius on scale R at this point. It is 313 feet.

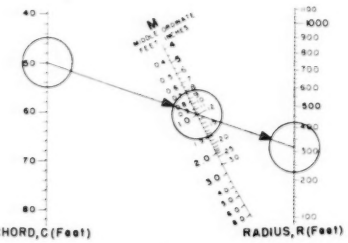
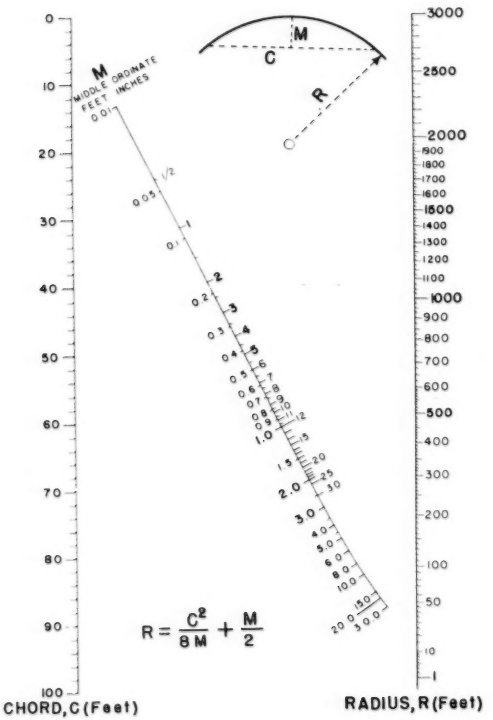


Exhibit 21



RADIUS CALCULATOR

USE OF AUTOMOBILES IN U. S. A.

The following facts based on a four thousand interview cross section survey of the U. S. population are taken from the booklet "The Work Cars Do," published by the Automobile Manufacturers Association.

59 million American adults use passenger cars daily.

50 million are part of car-owning households.

9 million in non-car-owning households also use cars daily.

The nation's passenger cars travel 316 billion miles per year.

The typical car travels 9,340 miles yearly.

69% of the typical motorist's winter driving is for necessity use.

57% going to and from work.

12% for shopping.

79% of those using cars to go to work do so 5 days a week or more.

63% of daily use of cars by professional and managerial groups is for livelihood purposes.

69% of use by salesmen is for livelihood.

56% of use by semi-skilled workers is for livelihood.

9 million cars are 12 or more years old.

16½ million cars are 9 or more years old.

The average pre-war car has 73,230 miles on its speedometer.

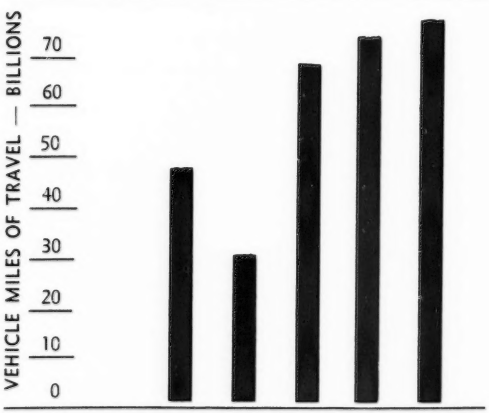
3,700,000 cars were scrapped in 1950, a 95% increase above pre-war rates.

There are nearly 6 million cars on U. S. A. farms.

The average farmer's car has 41,800 miles on its speedometer.

The typical car in metropolitan areas has 41,000 miles on its speedometer.

Traffic Trends



TRAVEL ON RURAL ROADS FOR FIRST FOUR MONTHS OF 1941, 1943, 1950, 1951 and 1952.

Based on Bureau of Public Roads Data

Control their approach speeds . . .

High approach speed to a signalized intersection is an all too familiar part of the traffic accident pattern.

Many intersections are susceptible to this danger, especially in rural areas.

The MODEL 812 ELECTRO-MATIC® DISPATCHER can help!

RED DELAY INTERVAL

In the absence of traffic the resting position of the signal is red in all four directions. As an approaching car actuates a detector, the green light is not shown until after a delay interval, which has been gauged to insure that the driver slows down to a safe speed before entering the intersection.

When traffic is passing through the intersection, the operation of the MODEL 812 is indistinguishable from normal full-actuated control, detectors being installed on all approaches. However, when traffic slackens, with its attendant invitation to increased approach speed, the speed-controlling "all-red" interval automatically appears in the cycle.

DUAL CLEARANCE

As a further safeguard the MODEL 812 provides a dual clearance interval on each phase, with an all-red following the yellow. Both portions of this clearance interval are knob-adjustable, of course.

Write us for Bulletins 516 and 517

TRAFFIC ACTUATED®

Automatic Signal Division
EASTERN INDUSTRIES INCORPORATED
NORWALK, CONNECTICUT

In Canada, Northern Electric Co., Ltd., Belleville, Ontario

Speed Measurements in 1910

EDITOR'S NOTE: *The following excerpt from "The Law of Automobiles" by C. P. Berry is of historical interest to traffic engineers. It pertains to the case, Com. V. Buxton, 205, Mass. 49. N. E. 128 (1910). It is reproduced through the courtesy of Callighan & Company, Law Publishers, Chicago, Illinois.*

IN a prosecution of the violation by a motorist of a speed regulation the state offered in evidence an instrument called a "Photo-Speed-Recorder," which had been used by the witness producing it to ascertain the speed of the automobile at the time of the alleged violation. This instrument consisted of two similar photographic cameras, set side by side in the same box. It was arranged so that each camera took a picture with an exposure of approximately one hundredth of a second, and was provided with a mechanism which automatically exposed one camera approximately one second after the other. It was also provided with a chronometer of a stop watch variety so arranged that the shadow of a dial divided into thirtieths of a second was shown, together with the shadow of the hand in its position on the dial, upon the plate in each separate camera, and this was simultaneous with the exposure of the plate in each camera. In order to use the apparatus for determining speeds the following rule was employed: The distance of any external object from the lens of a camera is as many times greater than the distance of the image on the photograph plate from the lens as the size of the object is greater than the size of the image. Or, as otherwise expressed: The distance of the object equals the distance from the image to the lens times length of object divided by length of image.

In order to prove that the instrument offered in evidence and which was used to test the speed of the automobile in question, when employed in conjunction with the aforesaid rule, was adapted correctly to ascertain distances, the state offered the following proof: That the witness who made the test in question, previous to making said test, had been furnished with and knew the distance of the image from the lens (i.e. focal length) in each camera; that he had 8 or 10 times photographed, with each camera, an object at distances varying from 30 to 300 feet; that he had measured the length of the object; that by employing the focal length, as given to him, the length of object and the length of image (when developed on photographic plate) in their proper places in the aforesaid formula, he had calculated in reference to each of the tests in the aforesaid series, and in reference to each of the cameras as respectively involved therein, the distance from camera to object; that the witness had measured with a tape and corresponding distances from camera to object, and that as measured and as experimentally obtained the result agreed in each case.

The "Photo-Speed-Recorder" was used by the witness in the method above described to photograph the rear of the defendant's receding automobile. Then measurements were made by him of the wheel tread (i.e., the distance from the middle line of the tire of one of the rear wheels to the corresponding point on the other rear wheel) of the image on the photographic plates, and of the corresponding length of the automobile. The figures thus obtained, together with the focal length as previously verified, were employed in their proper places in the aforesaid formula, and the distance from the camera to the automobile at the instant of each exposure was thus calculated. Subtracting one distance from the other gave the distance traveled by the automobile between the times of the two exposures. Reading of the watch hand and shadow cast with the dial shadow upon the plate gave the time between the two exposures. Making the usual reductions of elapsed time from seconds to hours and of the distance covered from feet and inches to miles, the speed in miles per hour was calculated and found by the witness.

The state offered to prove that the chronometer contained in the instrument had been compared by the witness with stop watches carried by two witnesses and also with the standard chronometer in the physical laboratory of the Massachusetts Institute of Technology and had been found in each case to be accurate.

All of this evidence was admitted by the trial judge, the defendant objecting and excepting on the ground of the "insufficiency of the ex parte experiments intended to show the reliability of the machine," and because of the failure of the state "to show the trustworthiness of said stop watch mechanism, an integral part of the apparatus." It was contended that the experiments were insufficient, because in the experiments the apparatus was used to photograph a stationary object, while in case of the automobile the object was moving; that in the former only distance was ascertained, while in the latter the instrument was used to ascertain speed as shown by both distance and time.

In sustaining the trial judge, the court declared that, as a rule the question whether evidence of experiments shall be admitted depends largely upon the discretion of the trial judge, the exercise of which discretion will not be reversed unless plainly wrong; that it could not be said as matter of law that the evidence in this case would not justify the judge in coming to the conclusion that the experiments would be useful in determining the speed of the automobile; that, indeed, it would seem desirable to have some machine whose action being dependent upon the uniform working of the laws of nature would record the speed of a moving object; that the fact that the experimenter was not an expert was not fatal to the introduction of the machine; and that the evidence as to the accuracy of the chronometer was admissible and justified the trial judge in submitting that question to the jury.

CHARACTERISTICS OF LEFT TURNING

(Continued from page 373)

Analysis revealed a correlation between time and distance required to traverse a turning curve and the speed attained at the final tangent point. It was found that higher speeds, measured at the final tangent point, do not decrease the time required to traverse a left turn. These higher speeds do increase the total distance traveled. The increased distance is not evidenced by an increased turning radius, but it occurs through the use of a longer transitional spiral at the completion of the turn.

STOP
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SCHOOL
15 M.P.H.
R R
DO NOT
ENTER
NO
PARKING
BUS
STOP
MEN
WORKING
MIROFLEX
America's Finest
COMPLETE SIGN LINE
Here's the line that has everything that your community will ever need in the way of signs, from standard street name assemblies and traffic control signs to special order jobs that meet your most exacting specifications. All Miro-Flex signs are manufactured to meet standards established by the U. S. Public Roads Administration. They are embossed on zinc-coated, Bonderized steel and finished with the best baked-on enamel. Write today for prices and your copy of Miro-Flex's catalog.
THE MIRO-FLEX CO., INC.
1824 EAST SECOND STREET WICHITA, KANSAS

(Continued from page 370)

ing, it seems certain that some new method of vertical parking with a maximum utilization of space and manpower, resulting in lower cost to the public, will come about. The costs of parking must be lowered even if some form of city subsidy through tax relief is necessitated. Along these lines *Life Magazine* recently had an illustration of a new type of pidgeonhole parking garage constructed in Washington, D. C., and operated by one man through push buttons. This new type looks like it may be in the right direction, provided the costs of construction are not prohibitive.

Conclusion

Gentlemen, I feel very much as if I have been carrying coals to New Castle in writing for traffic engineers on the subject of traffic problems. I feel very keenly, however, about the importance of traffic and the traffic engineering profession. Since any land use generates traffic like a magnet pulls steel filings, and since the only permanent solution of the traffic problem would be a complete dispersal of land usage, and since this is beyond any probability or possibility of happening, it must follow that current traffic problem solutions can only be of a somewhat interim nature. This means that the traffic engineer should have an *ever-growing market* for his services.

FLEXIBLE
DUR-O-LINE TRAFFIC LANE MARKERS

SAMPLE ORDERS AVAILABLE
200 DUR-O-LINE markers (white or yellow) with 200 asphalt pins and adhesive for installing.
$52.00 Postpaid

The famous DUR-O-LINE Lane Marker, that has done so much to reduce the cost of traffic lanes, is now available made of a new, flexible, unbreakable plastic. Put them down once . . . your traffic lines are bright and clear for years to come without further attention! You'll want these new *Flexible* DUR-O-LINE Markers where traffic is heavy . . . they're just as easy to put down on concrete or asphalt as DUR-O-LINE *Rigid*. Write for complete details at once.

DUR-O-LINE Flexible
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WRITE Dept. T for information about sample DUR-O-LINE Lane Markers

TRAFFIC SAFETY SUPPLY CO.
N. E. SANDY BLVD. AT 27TH, PORTLAND 12, ORE.

TRAFFIC NEWS

Annual Meeting Arrangements Virtually Complete

Plans for the 23rd Annual Meeting of the Institute of Traffic Engineers scheduled for September 8 through 11th, 1952, in Chicago have been almost completed by the ITE Local Arrangements Committee under the Chairmanship of Leslie J. Sorenson.

The meeting this year is a double feature, for the Institute will help honor the 100th anniversary of the founding of the American Society of Civil Engineers by participating in the Centennial of Engineering being organized in Chicago's Museum of Science and Industry September 3-13, 1952. Participation by some 58 engineering societies holding their meetings during this period will result in the world's greatest convocation of engineers numbering some 30 thousand. The Centennial is planning a gigantic exhibition of Engineering Progress including an elaborate stage production dramatizing engineering.

During the four days the Institute will hold committee meetings, its business meeting, several technical sessions, and special field trips for registrants making requests.

The Institute's headquarters will be the famous Hotel Sherman, scene of so many notable conventions in the past, visited by all the great personages of the American era since the middle of the 19th century. The Local Arrangements Committee has succeeded in reserving all of the public meeting and guest rooms for the use of the Institute's delegates and visitors, in short the Hotel Sherman, for the time being, will become the Institute of Traffic Engineers' Hotel.

With a battery of more than 1,200 employees and 1,500 rooms, convention halls, private dining rooms, a two-story private dwelling house on the roof which a President of the United States opened and dedicated, visiting guests of the hotel can be "at home away from home."

Many restaurants are handy in the hotel where guests may dine in leisure or "grab a sandwich," all in the confines of one building—with specialization and dramatization in foods, shelter and entertainment the prime aim.

Once a guest who visits Chicago by automobile parks his car in the spacious Hotel Sherman garage or arrives by cab he is "at home."

Among the many facilities available is a laundry with the most modern equipment and large enough to serve an entire city of 30,000 population; a modern new eight-lane bowling alley, the only hotel in Chicago having this feature; a radio in every room with television sets in each suite for a small extra fee; a drugstore in the lobby; the coast-to-coast "Welcome Travelers" radio show broadcast daily Monday through Friday and features Tommy Bartlett; the best in service facilities; and a public relations office offering free services to guests and conventions, and dozens of other services. Enough electric power is generated by the hotel to light a city of 40,000.

The hotel's guest rooms, dining rooms, ballrooms, spacious exhibition hall and restaurants are among the most modern in the country.

Only recently the Hotel Sherman completed a remodeling, redecorating and refurnishing program of all guest rooms and restaurants at a cost of more than $1,000,000.

Guest room decorations are the most modern with ebony furnishings, bronze fixtures and a trace of Chinese influence in the motif. Upholstered chairs are ebony finished with movable and washable cushions in red plastic. Bronze lamps of new and original design, never before used in hotel furnishings, lend handsomeness to the decorations.

One of the many outstanding new features is the extra large and roomy beds. Twin beds are arranged end-to-end, or located at right angles to each other, with bookcase headboards separating them to afford privacy. This idea was originated at the Hotel Sherman more than fifteen years ago by the late Ernest Byfield, president of the hotel for many years, who originated a new advertising slogan, "Twin Beds With Privacy."

Outside of the hotel and within walking distances are the many movies and theaters offering the latest in stage plays, and a shopping district along State Street, a boulevard of the finest shops in the nation.

Also within walking distance of the hotel, one can reach beautiful Lake Michigan, dotted with yachts and beautifully sanded beaches.

Right from the Hotel Sherman, a sight-seeing bus can be boarded for many tours throughout the vast city. A drive along the Lake Shore, overcast with one of the world's most beautiful skylines, is breathtaking.

The "Drive" reaches for miles along the lakefront, worming its way south into the heart of the steel industry or north into Chicago's beautiful suburbs of wide, quiet streets, into the residential district of beautiful homes in outlying Evanston, the home of Northwestern University; Winnetka, where the famous Bahai Temple is located; Lake Forest, Highland Park, Lake Bluff, Deerfield and many other suburbs.

In sports, Chicago has them all. The Windy City is the home of the Chicago Cubs of the National League and the Chicago White Sox of the American League. Every sport is offered in season, while famous Soldiers' Field, also within a short distance of the Hotel Sherman, plays host annually to high school and professional football games, automobile racing, circuses, track meets and the big civic events of the city.

Other places to visit and a "must" during a trip to Chicago is the world famous Buckingham Fountain on the lakefront; the Merchandise Mart, boasting the largest office floor space of any building in the United States, Adler Planetarium, the Art Institute, Chicago Academy of Sciences, Chicago Historical Society, Chicago Natural History

Museum, Museum of Science and Industry, Oriental Institute Shedd Aquarium, Garfield Park Conservatory, Lincoln Park Conservatory, Brookfield Zoo, Lincoln Park Zoo, and hundreds of other points of interest.

Transportation facilities in Chicago are among the best; while one of the most important things to remember for the visitor who wishes to walk, Chicago is probably the most simply laid out city of the nation, being bordered on the East by Lake Michigan, with a rectangular grid of north-south and east-west streets.

The heart of the city is known as the loop district lying midway of the shoreline a short distance west of the lake front. The loop, so called because of being bounded on all sides by the elevated tracks around which move counterclockwise the transit system electric trains affording turn-around for the routes north, west and south, is comprised of some 35 blocks. In Chicago eight average block-lengths equal a mile of distance.

California Court Rules No Compensation in Disputed Access Case

In California, the state supreme court upheld the decision of the trial court in the case of Louis Schnider et ux v. State of California, to the effect that where a property owner had no direct access to a highway until the adjoining property was converted into an expressway abutting upon his property, he was not entitled to damages for loss of direct access, because construction of the expressway did not create such a right.

In upholding the lower court's decision the supreme court stated that where a property owner has no right of direct access to a highway before it is converted into a freeway abutting upon his property, nothing is taken from him by the failure to give him such a right when the conversion takes place. The allowance of compensation in such a case would amount to a gift rather than payment for the destruction of a right.

This is one of the most important judicial decisions on the matter of control of access in recent years. It could have great significance in connection with the controversial question of access rights to expressways on new locations.

Foreign Nations Join Centennial of Engineering

At least 15 foreign nations will officially participate in the Centennial of Engineering to be celebrated in Chicago this summer, according to its president, Lenox R. Lohr.

This foreign participation is in addition to the plans just announced by the Mutual Security Agency at Washington to bring a special mission of 200 especially chosen European engineers to the Centennial as part of a five-week inspection tour of the United States, during which they will study American production methods.

Lohr also announced that the number of American engineering societies and associations pledged to take part in the Centennial has now reached 58. They have a combined membership of almost 350,000 professional engineers covering practically every technical and scientific field. Prominent in shaping the program and other activities for these various participating groups are former president Herbert Hoover, and Charles F. Kettering, world leader in engineering research.

Largest single delegation announced so far will come from the Engineering Society of Norway. It will have 17 members. The Royal Society of Industrial Engineers, Belgium, will have an 11-man delegation; while the combined group representing Great Britain's Institution of Electrical Engineers, Institution of Civil Engineers, and Institution of Mechanical Engineers is also expected to show large proportions. The British electrical engineers will be headed by Sir John Hacking.

Dr. Takeo Fukuda, of Tokyo University and vice-president elect of the Japan Society of Civil Engineers, will head his nation's delegation. France has chosen George Darrieus, president of its Society of Civil Engineers and member of the French Academy of Science, to lead its national group which will also include members of other French technical bodies.

Other countries with assured representations from among their leading scientists and engineers are The Netherlands, Switzerland, Italy, India, Canada, Mexico, Cuba. Peru, and Uruguay.

Strenuous efforts are also being made to make possible the attendance of delegations from those Latin American nations from which no definite commitments have yet been received. One factor that may affect sizable attendance from below the Rio Grande is the unfavorable situation covering money exchange between Central and South American nations and this country. Latin American engineering groups maintain it may seriously hamper their tentative plans for attending the Chicago celebration.

LOOKING AHEAD

AUGUST 24-27, 1952—LOS ANGELES, CALIF.
American Public Works Association, Ambassador Hotel, Shrine Auditorium.

SEPTEMBER 8-11, 1952—CHICAGO, ILLINOIS
Annual Meeting, Institute of Traffic Engineers, Hotel Sherman.

SEPTEMBER 8-13, 1952—CHICAGO, ILLINOIS
Illuminating Engineering Society National Technical Conference, Edgewater Beach Hotel.

SEPTEMBER 20-24, 1952—ATLANTIC CITY, N. J.
Annual Meeting, American Transit Association.

SEPTEMBER 21-25, 1952—LOS ANGELES, CALIF.
International Association of Chiefs of Police, Biltmore Hotel.

SEPTEMBER 28-OCTOBER 2, 1952—KANSAS CITY, MISSOURI
International City Managers Assn.

SEPTEMBER 29-OCTOBER 2, 1952—BOSTON, MASSACHUSETTS
Annual Convention, International Municipal Signal Assn., Inc., Hotel Statler.

OCTOBER 5-8, 1952—BOSTON, MASSACHUSETTS
American Society of Planning Officials, Copley-Plaza Hotel.

OCTOBER 6-10, 1952—NEW YORK CITY
American Trucking Association—18th Annual Convention, Waldorf-Astoria Hotel.

OCTOBER 17-18, 1952—CHICAGO, ILLINOIS
The President's Highway Safety Conference.

OCTOBER 20-24, 1952—CHICAGO, ILLINOIS
40th National Safety Congress and Exposition of the National Safety Council.

NOVEMBER 19, 1952—NEW YORK, N. Y.
34th Annual Meeting, American Standards Association, Waldorf-Astoria Hotel.

NOVEMBER 30-DECEMBER 5, 1952—NEW YORK, N. Y.
Annual Meeting, The American Society of Mechanical Engineers, Statler Hotel.

Urban Problems Conference Held In Portland

The Fourth National Businessmen's Conference on Urban Problems held June 23-24 at the Multnomah Hotel, Portland, Oregon, keyed to the theme "Business Action for Better Cities" was an outstanding success. The Conference was sponsored by the United States Chamber of Commerce in cooperation with the Portland Chamber of Commerce.

The Conference was attended by leaders in industry and commerce from throughout the nation. The first morning session panel discussed Urban Planning Problems including suburban development, industrial plant location, commercial facilities location, planning problems in fringe areas, and the consolidation of urban areas. The afternoon panel on the first day was devoted to the theme "Streamlining Urban Traffic." Participants included Henry W. Barnes of Denver, and Thomas E. Willier of Houston, with Henry K. Evans of Washington, D. C., as Secretary, all members of the Institute of Traffic Engineers.

The second day's panels were on the subject of "Off-Street Parking" including participation by ITE member D. Grant Mickle, and "Urban Redevelopment." The June 24th luncheon session was addressed by ITE member G. Donald Kennedy, Assistant to the President, Portland Cement Association, Chicago, speaking on the subject, "Will Our Cities Survive?"

TRAFFIC ENGINEERING hopes to run the statements of some of the panel participants in a series to begin with the August issue, if suitable arrangements can be completed.

Summer Institute for Traffic Training Set

The Traffic Institute of Northwestern University has announced the schedule of courses offered during its annual Summer Institute for men and women working in traffic and traffic safety. The eight courses will afford registrants an opportunity to learn the latest methods in each field of activity designed to promote reduction of accidents and congestion.

The schedule:

June 16-27—Driver License Examiner Instructors' Course

June 23-27—Motor Vehicle Fleet Supervision

June 23-28—Chemical Tests for Intoxication

July 7-11—Seminar in Traffic Engineering

July 7-11—Public Information Programs for Police (Traffic)

July 7-18—Supervisory Officers' Training Course

July 14-18—Accident Records and Uses

July 10-11—Traffic Safety Seminar for Newspapermen

The *Seminar in Traffic Engineering* July 7-11 is designed for engineers working in traffic who wish refresher-type training; for those working in related activities such as city planning, development, etc.; and for engineering students. The most pressing problems in traffic engineering will be considered. George W. Barton, engineering director of Associated Consultants will coordinate the seminar. The fee for the seminar is $50. Further information is available upon application to Director of Training, The Traffic Institute, Northwestern University, 1704 Judson Avenue, Evanston, Illinois.

ON THE SHELF

Editor's Note: *Mrs. Kathryn Cassidy, Librarian, Yale Bureau of Highway Traffic,* who has been compiling the On the Shelf material so ably since 1950 is taking a year's leave to accompany her husband during his travels in connection with his research as a recipient of a Ford Foundation Fellowship. During her absence Mrs. Kagan has generously consented to compile On the Shelf.

Compiled by Mrs. Cele Kagan
Acting Librarian

New York Department of Public Works, Bureau of Highway Planning.

Vehicle Operation Speed Studies; Normal Speeds and Speed Distributions on Rural Highways. The Bureau, 1951.

A report on 6884 speed samples of all types of vehicles taken at 23 sites. It reveals that the average speed of cars increases 0.3 m.p.h. for each additional foot of pavement over 20 ft. wide and the average speed of trucks increases 0.2 m.p.h. for each additional foot over 20. No difference in speed was observed because of road surface on highways in the same route classification and with the same width of pavement.

Norfolk, Virginia. City Planning Commission.

Major Highways and Collector Streets. The Commission, 1950. 63p., maps.

Fourth of a series of reports on the City Plan Program. The other three were on Subdivision Regulations, Land Use Survey and Zoning Plan and Ordinance.

North Carolina State Highway and Public Works Commission, Division of Statistics and Planning.

Report on Railroad Grade Crossing Hazard Rating Study on North Carolina Secondary Rural Roads, July, 1951. Part I (see Part II for tables). The commission, in cooperation with the United States Bureau of Public Roads. 1951. Variously paged, maps.

Before launching a 12,0000-mile paving program for secondary roads, North Carolina instituted an extensive study of grade crossings in terms of potential hazard. A Hazard Index Formula was developed, based on the physical characteristics of the crossing, the number of vehicles using it, the numbers and times of trains and the reports of accidents which had occurred previously at each one. The relative accident potential was estimated and a priority rating list made.

Northwest Traffic Engineering Conference.

Proceedings, The Fourth Annual. . . . Conference held at the University of Washington, Seattle, May 17-18, 1951. Sponsored by *Institute of Traffic Engineers,* Western Section; State of Washington, Department of Highways; University of Washington, Civil Engineering Department.

Maryland. Montgomery County. County Council.

Report of Public Parking Lot Technical Advisory Committee to County Council. The Council, 1952. 29pp.

The report recommends that Parking District Act and Zoning Ordinance requirements be identical and that a more equitable set of standards be evolved; that building permits be limited to those for which parking facilities can be provided; that the Parking District tax assessment be reduced to half rate where required parking space is restricted to customers only and full exemption from this tax where required parking facilities are provided for free public use, and that county parking facilities should incorporate approved design principles.

Massachusetts. Boston. City Planning Board.

General Plan for Boston. (Preliminary report). The board, 1950. 63pp.

Findings and recommendations in business and industry, residence, schools and recreation and transportation.

SECTION NEWS

Missouri Valley Section

On May 14 the Missouri Valley Section of the Institute of Traffic Engineers held a meeting at the Tiger Hotel in Columbia, Missouri. Members of the Section present were in Columbia to take part as instructors in a Traffic Short Course conducted by the University of Missouri, College of Engineering.

Melvin Bierman, member ITE, and city traffic engineer for St. Joseph, Missouri, applied for membership and was formally accepted as a member of the Section.

It was decided to make a canvass of eligibles in the Missouri Valley Section area so as to increase the membership insofar as possible. A resolution of regret was given expression to the Section's loss of two members, Mr. J. E. Johnston and Mr. Bryan Wilson, both of whom have moved out of the Section territory.

The Missouri Valley Section went on record as favoring a bid for Kansas City to be the site of the 1954 ITE National Convention. It was felt by the Section membership, however, that the Section would yield on this bid to a city from the mid-south.

The Section voted to poll the full membership of the Missouri Valley Section in order that an expression of opinion on Toll Road Legislation and a concept of Toll Roads might be obtained. The information thus secured will be passed along for the attention of proper governmental agencies in the area.

Officers for the coming year as elected at this meeting are: Mr. George Fisher, President, Mr. Leon W. Corder, Vice-President, and Mr. Joseph Feuchter, Secretary-Treasurer.

Reported by Leon W. Corder
Acting Secretary

Michigan Section

On May 27th, 1952, the annual meeting of the Michigan Section of the Institute of Traffic Engineers was held at the Indian Hills Golf Club in the City of East Lansing. There were 29 members and guests in attendance.

The following officers were elected: Albert C. Sherman, President, Samuel J. Levine, Vice-President, Sven Kansman, Secretary.

A motion was made by Jerome Franklin and seconded by William Potts that the Michigan Section set up a legislative committee to study all acts of legislation brought before the Michigan Legislature pertaining to automotive safety and operation. The motion was carried. Jerome Franklin was appointed Chairman of this committee.

Mr. Allen Hayes, Glenwood Baker, and Walker Wright composed the committee responsible for this meeting.

Reported by Samuel J. Levine
Secretary-Treasurer

Midwest Section

The May meeting of the Midwest Section was held at the Chicago Engineers Club with approximately 45 members in attendance. President Bill Marston asked each member to introduce himself following which he turned the meeting over to Les Sorenson for the purpose of receiving reports from Chairmen of the Annual Meeting Committees.

Before asking for committee reports Sorenson stressed the fact that the old motto "Tempus Fugit" applies to our convention planning at this time. He said that we are on parade before the public and other engineers who will be in Chicago during the Convocation period of the Centennial.

Harry Porter, Chairman of the Entertainment Committee, reported that Mrs. Ralph Michel has accepted responsibility for Ladies' Activities and Bill McConochie has accepted responsibility of the Biscuit Banter Breakfast.

Al Forde, Chairman of the Banquet Committee, reported that the Bal Tabarin room has been selected for the Banquet and investigation is now under way as to the possibility of obtaining top flight entertainment, gratis. The banquet will include a Cocktail Party and top notch speaker as yet uncommitted. Plans are to distribute favors to the ladies and to make use of the rotary projector installed in this room to project pictures on the walls, during the evening.

John Zimmerman, Chairman of the Exhibition Committee, was not present. Ralph Michel reported that the Centennial Committee has taken primary responsibility for the exhibitions and at this point is in need of ideas and suggestions.

Dick Bennett, Chairman of the Public Relations Committee, reported that his committee has been quite active and has several projects completed and several more underway. We have received 25,000 stickers which will be distributed to individuals and organizations according to their needs for use on correspondence with others by way of publicizing the meeting. The services of Carl Byoir, Public Relations Associates, have been secured and they are preparing plans for regular newspaper and magazine releases as well as publicity through the wire services, radio and television. Discussion is underway regarding the publishing of a Convention issue of the Magazine which will include articles and advertising geared for the attention of those attending the convention and emphasizing local activities and products. A one-page flier describing the Annual Meeting is now in the hands of a printer. Plans are to obtain 7,000 copies of this flier which will be distribued to the expanded mailing list of the ITE.

Tom Wiley, Chairman of the Special Services Committee reported that travel information has been made available to the National office. Some of the special service plans by the committee include Lost and Found, transportation and special tours primarily for ladies and provisions will be made for taking care of any special requests or needs.

Jim Foley, Chairman of Hotel Arrangements Committee, reported that arrangements have been made for all necessary rooms and facilities needed for Convention activities. He requested that emphasis be placed on providing for those attending the ITE convention to also register with the Centennial. Foley also reported that it is the intention of the Centennial Committee to replace the flags of various nations at the Rosenwald Museum with flags of various Engineering Societies, including the ITE flag.

Dick Fencl, Chairman of the Reservations Committee, outlined the pre-reservation form being discussed by his committee and stated that cooperation with the public relations committee would be necessary in mailing out this information. Discussion was given to the suggestion that Police officers, representing the various Police Forces in and around Chicago, be assigned to the entrance and lobby of the Convention Hotel, in uniform and with white gloves.

George Barton, Chairman of the Technical Sessions Committtee, was not present.

Bill Marston reported that the Technical Sessions are shaping up and a tentative schedule will be available in the near future.

Mat Sielski, Chairman of the Financial Committee, reported that letters have gone out to various organizations requesting contributions for Convention expenses. Mat was somewhat disappointed in the section that apparently

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all the Committee Chairmen have either underestimated or not given sufficient thought to their budgetary requirements. He insisted that he have a report from each Chairman before June 1st stating total anticipated expenses as well as a breakdown of these expenses.

Leslie Sorenson thanked the committee chairmen for their reports but said that it was now becoming necessary to more closely coordinate the activities of the various committees and to begin to formulate and set the convention program. He accordingly appointed a program committee under the chairmanship of Bill Marston. This committee will consist of the chairmen of each of the other committees. After a period of general discussion of these committee reports, Les Sorenson turned the meeting back to the President, Bill Marston. The next meeting was set for June 12, 1952, and the meeting was adjourned.

Reported by Ralph F. Gross
Secretary-Treasurer

Washington, D. C., Section

On June 4, 1952, thirty-eight members, members' wives and guests gathered at the Army-Navy Club for the Annual Business Meeting and Ladies' Night of the Washington Section. The business portion of the program was confined to election of officers for 1952-53, and the treasurer's report. Newly-elected officers were: W. H. Voltz, President; Gordon K. Gravelle, Vice-President, and Henry K. Evans, Secretary-Treasurer. After a delicious chicken dinner the activities turned to the social side. Several games of bingo were enjoyed by the gathering with the prizes being evenly distributed. Don Loutzenheiser then showed a color film on the Pan-American Highway that proved interesting and instructive. Upon completion of the movies O. K. Norman brought out an auto racing game that proved very popular. Several people who insisted upon playing the 10 to 1 shot are still waiting to cash a bet. The Section Treasury, which was the banker, came out with a tidy profit. The meeting stood adjourned at 10:30 P.M.

Reported by W. D. Heath
Past Secretary-Treasurer

Western Section

Membership in the Western Section totalled 123 active members as of June 1, 1952. (36 Members, 49 Associate Members and 38 Junior Members). Since October 1, 1951, 10 new members have been added, and 11 have been lost (3 transferred, one deceased, and 7 dropped for non-payment of dues).

Northwest Traffic Engineering Conference

A highly successful conference was held in Corvallis, Oregon, May 14 and 15, with approximately 125 officials from Oregon, Washington and California in attendance. The conference was sponsored jointly by Oregon State College, Oregon Highway Department, and WITE.

The Oregon ITE members sponsored a dinner meeting May 14, with the usual fine fellowship.

Jack Faustman, one of the out-of-state speakers at the meeting, reported that Sacramento recently turned two city blocks into parking lots with good results. Early indications are that the new lots have increased the volume of downtown parking by encouraging more people to drive into the central business district. He pointed out that city-operated parking lots must cater to short-time parkers and discourage all-day parking to be successful. The Sacramento lots have fees of 10c per hour for the first two hours, and 15c per hour thereafter.

J. C. Young, Traffic Engineer, California Division of Highways, reported that highway bypasses represent a major contribution to faster and safer travel. The influx of new business into the bypass areas must be limited, however, if the bypass is to retain its effectiveness throughout the years.

Traffic control devices and signs were discussed by W. O. Widdows, Sign Engineer for the Oregon Highway Department, demonstrating latest developments in signs.

At the Wednesday session, William A. Bugge, Director of the Washington Department of Highways, said traffic engineering still is a relatively unexplored field but if properly handled can reduce future traffic hazards.

Three traffic officials pointed out the value of traffic accident records. Carlton Robinson, Assistant Traffic Engineer, Portland, said records can be used to determine where road improvements are needed, to help determine priority and to measure results. Captain Gene Ferguson, chief of the Portland traffic bureau, and Captain Walter Lansing, Director of the Oregon Traffic Safety Division, said enforcement officers can use accident records in their campaign to eliminate accidents and in deploying officers to areas of greatest danger and congestion.

AN ODE TO DE FEET OF DE YOUNG

On the Campus of Corvallis, the Tale is now told,
How De Feet of De Young, arose to Glories of Old.
Enjoined in a battle, on the concourse of clay,
With both hands on his racket, Skin ruled o'er De Day.

Still deigned not to show, Dunn went by De Fault,
De Victory half won, De Battle wuz now fought.
A service that twisted, like a tornado born wind,
Tore De Racket right out, De Bloody hand of Win.
A net dusting shot, placed to the "nth" De Gree,
Sent Chaffee down spinning, De Pants tore at De Knee.
De Sposing of Washington, Skin played Oregon Coeds,
Till their horrified coach, from De Court had them led.

Though ten Chukkers were played, and only five wickets were won,
De Laddie from Downunder, De Moral victory had spun.
With De Feet on De Chair, and De Head lowly bowed,
De Young when last seen, was A Snorin out loud.

Ano Nymous

News From Our Roving Reporter

Ellis Mathes is finishing his year as President of the Idaho Chapter of Professional Engineers. The first building of the new Idaho State Building Program has been completed. It is to be used by the Traffic Engineering Department. A fine sign shop, electrical workshop and suitable office space have been turned over to State Traffic Engineer Mathes and his staff.

Wayne Morris and Charles Haley of Phoenix attended a fine Safety Conference recently. It was held near the Gulf of California.

Arch Bollong addressed the Idaho League of Cities at their Annual Meeting in Lewiston on May 15.

Stewart Fischer—a classmate of many of the Western Section in New Haven last year—has been appointed Traffic Engineer for the City of San Antonio, Texas.

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San Diego News

Ed Hall, San Diego County Traffic Engineer, is preparing a comprehensive Traffic Ordinance to be presented to the County Board of Supervisors. Highlights will be the establishment of a County Traffic Commission and the gathering of all past ordinances to be repealed and incorporated into one complete ordinance.

Two studies underway in San Diego County are the Before and After Effect of a Portaflash unit at a rural school crosswalk and a general study of the Alvarado Freeway traffic volumes, accidents, and capacities.

The new safety lighting on the Montgomery Freeway is due for completion in a short time. It consists of 20,000 lumen mercury vapor lights at a 38-foot mounting height, extending from Chula Vista to Palm City. Mel West is in charge of design of the lighting project.

Ralph "Yellowtail" Luckenbach has once again joined the annual parade of sport fishers down San Diego way in quest of one of the big yellowtail fish. Up until last Saturday he had not found anything but an old innertube in the ocean.

Jim Reading is having a rough time with his One-Way Street Grid System in San Diego. The City Council has referred it to Council Conference for a time. The opposition consists of the Motor Car Dealers, Downtown Merchants, and the Chamber of Commerce. A number of suggestions have been offered as a compromise, but no definite action has been taken without further study of the proposals.

Bill Garrett is leaving Jim Reading's staff at San Diego to go with the State Division of Highways. His first assignment will be in the bridge department working on the new freeway at Oceanside.

San Diego is working on an extensive guide sign program. Approximately 650 signs are to be installed at stragetic locations throughout the city by George Parmelee and the Auto Club.

Our San Diego news-hound, Jack Henberger, has recently been accepted as a new member of the San Diego Engineers Club.

Reported by Donald S. Berry
Secretary-Treasurer

Penn State Announces Short Courses

The Institute of Public Safety, Pennsylvania State College, has announced a series of short courses and conferences to be conducted this fall. The schedule is as follows:

Industrial Safety Institute — September 8-12.

Motor Fleet Supervisor Training — September 22-26.

Traffic Engineering Conference—September 30-October 2.

Top Management Motor Fleets Conference—November 13-14.

The *Traffic Engineering Conference* has been planned with the assistance of the Institute of Traffic Engineers, the Pennsylvania Department of Highways, and other groups interested in efficient traffic flow, and is designed for traffic engineers, municipal engineers, highway engineers, traffic officers and others concerned with traffic engineering problems. Registration fee is $10.

Additional information may be obtained by writing Joseph Intorre, Institute of Public Safety, The Pennsylvania State College, State College, Pennsylvania.

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Secretary's Column

The Board of Direction held its quarterly meeting at Chicago's Hotel Sherman on June 13 and 14, during which your Secretary was initiated in the mysteries of Board operations. Fortunately, the Board had arranged for Fred Hurd to be present to tie up the dangling ends of matters held over from previous meetings, and to render me invaluable counsel in my introduction to Board affairs.

Among the matters disposed of was adoption of an *official seal* and revised form of membership certificate for its utilization; procedure relating to Sustaining Organization structure; an examination of the *Institute's* financial condition and business operation of TRAFFIC ENGINEERING; resolution of congratulation to ASCE on its 100th anniversary; resolutions of appreciation; approval of Rules of Procedure of The Technical Council; approval of the revised constitution and by-laws of the Midwest Section; approval of Technical Committee and Administrative Committee Reports; approval of 9 promotions in membership grade to 3 Associates, 6 full Members; election to membership of 12 new Juniors, 5 new Associates and 1 new Affiliate; and many other items.

The Board and your Secretary were privileged to receive an extensive preview of coming events scheduled for the 23rd Annual Meeting September 8-11. Les Sorenson, Chairman of the local Arrangements Committee gave a full report of arrangements, which are all virtually complete. (See Traffic News, also Section News.) Al Forde, Harry Porter, Ted Siegel and Ted Vanderstempel supplied me a lot of details, and I can assure you that the Midwest Section is going to put this Annual Meeting on in a manner that will be long remembered. Every ITE member should immediately plan to make attendance a MUST even if he (or Miss Woolverton—our only *gentle* member) has to hock the family heirlooms, for you'll certainly never regret being present at this affair. A fine program of entertainment is in the making for the ladies, so let us all be sure that the loan also includes trip expenses for the wives. —*Only one wife per member permissible.*

Local Arrangements has called on Headquarters for help in putting on one of the planned features and to come through, Headquarters must issue a clarion call to the "Old-Timers." There is urgent need of usable photographs of the first meetings—especially those of October 2, 1930, January 20, 1931, and October 1931—photographs of the first officers, both as group and individuals, also the earlier officers, group activities, committee meetings, and personals of all kinds which relate to any of the earlier ITE activities. These photographs will be made into projector slides for use in one of the features relating to progress of the *Institute*. The pictures will be returned undamaged to their owners by Annual Meeting time. Please, Old-Timers, look through your personal archives and loan Headquarters those early ITE photographs. Please put your signature on the back of each photo and briefly describe the subject insofar as you can as to dates, names, events, etc. Send them on as soon as you can, so that Headquarters will not fail the local boys. Thanks.

Tim Todd

National Association for Road Accident Prevention Formed

Under the direction of the Belgian Minister of Public Works a National Association for Road Accident Prevention, "Via Secura," has just been formed. Main objectives of the association are: (1) survey, carry out and coordinate educative measures to decrease accidents; (2) study questions concerning accident prevention; (3) participate, as required, in foreign or international efforts for reducing road accidents.

Among members of the association are the Belgian Road Federation, The Royal Automobile Club of Belgium, the Routing Club of Belgium, the Federation of Motor Industry and Trade Association, the Federation of Insurance Companies, the Red Cross of Belgium and interested government agencies.

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Philip C. Cooper, Director Department of Public Works, Salisburg, Maryland.

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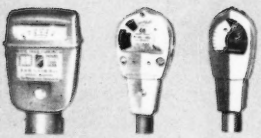

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